STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *GOVERNOR*

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Hearing Opened:	December 13, 2002
Staff:	Jim Baskin
Staff Report:	February 14, 2003
Hearing Date:	March 5, 2003
Commission Action:	

STAFF REPORT: APPEAL

DE NOVO HEARING

APPEAL NO.:	**A-1-CRC-02-150**
APPLICANT:	**Beth M. Forest Trust**
AGENT(S):	**Tom Kraft**
LOCAL GOVERNMENT:	City of Crescent City
DECISION:	Approval with Conditions
PROJECT LOCATION:	1100 South Pebble Beach Drive, Crescent City, Del Norte County, APN 118-300-03.
PROJECT DESCRIPTION:	Construction of a 2,850-square-foot, 1- to 2-story, 13- to 25-foot-high, single-family residence with attached garage.
APPELLANTS:	Louise Campbell, Arthur R. Lewis, Michael Scavuzzo, and Marvin & Carol Root
SUBSTANTIVE FILE: DOCUMENTS	1) City of Crescent City CDP File No. 2001-02; and 2) City of Crescent City Local Coastal Program.

STAFF NOTES:

1. Procedure.

Pursuant to Sections 30625 of the Coastal Act and Section 13115 of the Title 14 of the California Code of Regulations, on December 13, 2002, the Coastal Commission found that the appeal of the City of Crescent City's approval-with-conditions of a coastal development permit for a blufftop single-family residence raised a substantial issue with respect to the grounds on which the appeal had been filed. As a result, the City's approval is no longer effective, and the Commission must consider the project *de novo*. The Commission may approve, approve with conditions (including conditions different than those imposed by the City), or deny the application. Since the proposed project is within an area for which the Commission has certified a Local Coastal Program (LCP) and is between the first public road and the sea, the applicable standard of review for the Commission to consider is whether the development is consistent with the City's certified LCP and the public access and public recreation policies of the Coastal Act. Testimony may be taken from all interested persons at the *de novo* hearing.

2. Incorporation of Substantial Issue Findings.

The Commission hereby incorporates by reference the Substantial Issue Findings contained in the Commission staff report dated November 22, 2002. For purposes of *de novo* review by the Commission, the applicant has amended its project description and provided Commission staff with supplemental information regarding structural foundation design and placement. The supplemental information provides clarification of the proposed project and additional information regarding issues raised by the appeal that was not part of the record when the City originally acted to approve the coastal development permit.

SUMMARY OF STAFF RECOMMENDATION *DE NOVO*: APPROVAL WITH CONDITIONS

The staff recommends that the Commission approve with conditions the coastal development permit for the proposed project on the basis that, as conditioned by the Commission, the project is consistent with the City of Crescent City certified LCP and the access policies of Chapter 3 of the Coastal Act.

Since the December hearing on the Substantial Issue determination, the applicant has amended its project description for purposes of the Commission's *de novo* review of the appeal to relocate all portions of the proposed residential structure's foundation elements outside of potential geologically unstable areas to assure that the project site is "suitable and adequate for the proposed use" as required by the LCP.

The new project description as amended by the applicant for purposes of the Commission's *de novo* review proposes relatively minor changes in the design of the residential development. The

project approved by the City would have allowed placement of the house foundation piers as close as five feet from the edge of the coastal bluff within an area that would be prone to potential slope failure during the economic life of the structure. Portions of the approved house would have cantilevered over the bluff area seaward of the foundation piers. The new amended house design proposes construction of the piers an additional five feet landward from the bluff edge, beyond the predicted zone of slope failure. The cantilever would be extended by five feet so the living space of the house would occupy the same area. With the newly proposed changes from the City-approved design as discussed above, the potential for exposure of the proposed development to geological instability is greatly reduced.

Staff is recommending a number of special conditions that will ensure the project's consistency with all applicable policies of the City's certified LCP and the Coastal Act. Several conditions would require the applicant to prepare and submit final design and construction plans that would ensure that the project is built as proposed, incorporates the recommendations and design criteria identified in the applicant's geo-technical and soils & foundation engineering reports, and provides a minimum 10-foot setback between the blufftop and the buildings foundation elements. As conditioned, the project would be safe from bluff retreat and consistent with the provisions of, Policy No. 3 of Chapter 5 of the LUP that require that new development not contribute to geologic hazards.

Further special conditions would require recordation of deed restrictions stating that no new shoreline protective device shall be constructed on the parcel, that the existing shoreline protection structure shall not be further repaired, maintained, reinforced, or extended, and that the applicant accepts sole responsibility for any damages or injuries resulting from waves, storm waves or bluff erosion at the site. These conditions would help ensure that no future seawalls are built at the site consistent with the requirements of LUP Chapter 5, Policy No.4 that mandates that new development not necessitate the construction of future seawalls.

Other recommended conditions would require that final design and construction plans reflect that the development as approved would: (1) utilize glass and roof surfaces that are non-reflective; and (2) install lighting so as to have a downward cast and be directed such that it would not illuminate areas beyond the project site. These conditions would achieve conformance with LCP visual policies by protecting views of the rocky shoreline, mitigate the loss of views that does occur, and protect visual character. In addition, any future additions or alterations to the development have been made subject to Commission review to assure that the additional development would not be exposed to geologic hazards, contribute to site instability, or impact visual resources.

Finally, another special condition of the staff recommendation would require that development be constructed and conducted consistent with these measures and other best management practices to ensure consistency with LCP policies regarding polluted runoff and protection of environmentally sensitive habitat.

Staff recommends that the Commission find the project, as conditioned, is consistent with the certified LCP and the Coastal Act public access and recreation policies by adopting the following resolution and findings.

MOTION, STAFF RECOMMENDATION *DE NOVO*, AND RESOLUTION:

Motion:

I move that the Commission approve Coastal Development Permit No. A-1-CRC-02-150 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 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 certified City of Crescent City LCP, is located between the sea and the nearest public road to the sea and is in conformance with the public access and public recreation policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

I. STANDARD CONDITIONS: See attached.

II. SPECIAL CONDITIONS:

1. Final Design and Construction Plans.

A. **PRIOR TO THE ISSUANCE OF COASTAL DEVELOPMENT PERMIT NO. A-1-CRC-02-150**, the applicant shall submit to the Executive Director for review and approval final design and construction plans which are consistent with the preliminary site plan submitted to the City of Crescent City Community Development Department on August 23, 2001 and subsequently revised in a letter from the applicant's agent dated January 24, 2002 with attachments (Lee Tromble Engineering, 1/24/03) received by the Commission on January 27, 2003, and attached as Exhibit No. 10. The final plans shall provide for locating all foundation piers for the proposed residence and garage a minimum of ten feet back from the blufftop. The final plans shall include site plans, floor

plans, building elevations, roofing plans, foundation plans, final material specifications, drainage facilities, and lighting plans consistent with the Commission's action on Coastal Development Permit No. A-1-CRC-02-150.

B. The permittee shall undertake development in accordance with the approved final design and construction plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final design and construction plans shall occur without a Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

2. Conformance of the Design and Construction Plans to Geotechnical and Engineering Reports

A. All final design and construction plans, including foundations, grading and drainage plans, shall be consistent with the recommendations contained in: (1) the geotechnical report dated December 20, 2001, revised December 11, 2002, and prepared by Busch Geotechnical Consultants; and (2) the soils engineering and foundation report dated August 22, 2001, revised January 24, 2003, and prepared by Lee Tromble Engineering, both of which provide for the placement of foundation piers at least 10 feet from the edge of the coastal bluff beyond the predicted zone of bluff failure. **PRIOR TO ISSUANCE OF COASTAL DEVELOPMENT PERMIT NO. A-1-CRC-02-150**, the applicant shall submit, for the Executive Director's review and approval, evidence that a licensed professional (Certified Engineering Geologist or Geotechnical Engineer) has reviewed and approved all final design, construction, and drainage plans and has certified that each of those plans is consistent with all of the recommendations specified in the above-referenced geotechnical and soils & foundation engineering reports approved by the California Coastal Commission for the project site.

B. The permittee shall undertake development in accordance with the approved final 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 Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

3. No Future Bluff or Shoreline Protective Device

A(1) By acceptance of this permit, the applicant agrees, on behalf of itself and all successors and assigns, that no bluff or shoreline protective device(s) shall ever be constructed to protect the development approved pursuant to Coastal Development Permit No. A-1-CRC-02-150, including, but not limited to, the residence, foundations, garage and driveway in the event that the development is threatened with damage or destruction from waves, erosion, storm conditions, bluff retreat, landslides, ground subsidence or other natural hazards in the future. By acceptance of this permit, the applicant hereby waives, on behalf of itself and all successors and assigns, any rights to construct such devices that

may exist under Public Resources Code Section 30235 or under the policies of the Crescent City Land Use Plan and Coastal Zone Zoning Regulations Chapter 17.84.

A(2) By acceptance of this permit, the applicant further agrees, on behalf of itself and all successors and assigns, that the landowner shall remove the development authorized by this permit, including the residence, garage, foundations, and driveway, if any government agency has ordered that the structures are not to be occupied due to any of the hazards identified above. In the event that portions of the development fall to the beach before they are removed, the landowner shall remove all recoverable debris associated with the development from the beach and ocean and lawfully dispose of the material in an approved disposal site. Such removal shall require a coastal development permit.

A(3) In the event the edge of the bluff recedes to within five feet of the foundation piers for the principal residence but no government agency has ordered that the structures not be occupied, a geotechnical investigation shall be prepared by a licensed geologist or civil engineer with coastal experience retained by the applicant, that addresses whether any portions of the residence are threatened by wave, erosion, storm conditions, or other natural hazards. The report shall identify all those immediate or potential future measures that could stabilize the principal residence without shore or bluff protection, including but not limited to removal or relocation of portions of the residence. The report shall be submitted to the Executive Director and the appropriate local government official. If the geotechnical report concludes that the residence or any portion of the residence is unsafe for occupancy, the permittee shall, within 90 days of submitting the report, apply for a coastal development permit amendment to remedy the hazard which shall include removal of the threatened portion of the structure.

4. <u>Assumption of Risk, Waiver of Liability and Indemnity Agreement</u>

A. By acceptance of this permit, the applicant acknowledges and agrees: (i) that the site may be subject to hazards from landslide, bluff retreat, erosion, subsidence, and earth movement; (ii) to assume the risks to the applicants 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.

5. <u>Design Restrictions</u>

A. All exterior materials, including roofs and windows, shall be non-reflective to minimize glare; and

B. All exterior lights, including any lights attached to the outside of the buildings, shall be the minimum necessary for the safe ingress and egress of the structures, and shall be low-wattage, non-reflective, shielded, and have a directional cast downward such that no light will shine beyond the boundaries of the subject parcel.

6. Future Development.

A. This permit is only for the development described in Coastal Development Permit No. A-1-CRC-02-150. Pursuant to Title 14 California Code of Regulations section 13253(b)(6), the exemptions otherwise provided in Public Resources Code Section 30610(a) shall not apply to the subject site. Accordingly, any future improvements to the structure authorized by this permit, including but not limited to repair and maintenance identified as requiring a permit under Public Resources Section 30610(d) and Title 14 California Code of Regulations sections 13252(a)-(b) or site development allowed without a coastal development permit subject to Chapter 17.84 of the City of Crescent City Coastal Zone Zoning Regulations, shall require an amendment to Permit No. A-1-CRC-02-150 from the Commission or an additional coastal development permit from the Commission.

7. Erosion and Runoff Control Plan

A. **PRIOR TO ISSUANCE OF COASTAL DEVELOPMENT PERMIT NO. A-1-CRC-02-150,** the applicant shall submit, for review and approval of the Executive Director, a plan for erosion and run-off control.

1) EROSION CONTROL PLAN

a. The erosion control plan shall demonstrate that:

(1) During construction, erosion on the site shall be controlled to avoid adverse impacts on adjacent properties and marine resources;

(2) The following temporary erosion and sedimentation control measures, as detailed in the "California Storm Water Best Management Practices Construction Activity Handbook, developed by Camp, Dresser & McKee, *et al.* for the Storm Water Quality Task Force, shall be used during construction: CA3-*Structure Construction and Painting*, ESC1-*Scheduling*, ESC2-*Preservation of Existing Vegetation*, ESC30-*Earth Dike*, and ESC50-*Silt Fences* and/or ESC51-*Straw Bale Barriers*; and

(3) Following construction, erosion on the site shall be controlled to avoid adverse impacts on adjacent properties and resources through the use of re-seeding and mulching of bare soil areas with noninvasive plant species or species native to the site.

b. The plan shall include, at a minimum, the following components:

(1) A narrative report describing all temporary run-off and erosion control measures to be used during construction and all permanent erosion control measures to be installed for permanent erosion control;
(2) A site plan showing the location of all temporary erosion control measures; and
(3) A schedule for installation and removal of the temporary erosion control measures.

2) RUN-OFF CONTROL PLAN

a. The run-off control plan shall demonstrate that:

(1) Run-off from the project site shall not increase sedimentation in intertidal environmentally sensitive areas and coastal waters;
(2) Best Management Practices (BMPs) shall be used to prevent the entrainment of excavated materials into stormwater runoff leaving the site and to prevent the entry of polluted stormwater runoff into coastal waters following construction of the residential structures, utility connections, and access improvements, including but not limited to the following:
(i.) site grading shall be performed to redirect all runoff from developed open areas on the site (yards and landscaped areas within the area of construction disturbance) away from the bluff edge and to drain toward the municipal stormwater drainage facilities within Pebble Beach Drive;
(ii.) runoff from impervious surfaces (i.e., roofs, driveway) shall be collected and conveyed into the municipal stormwater drainage system within the right-of-way of Pebble Beach Drive; and
(iii.) use of relevant best management practices (BMPs) as detailed in the California Storm Water Best Management Practices Municipal and Construction Activity Handbooks, developed by Camp, Dresser & McKee, *et al.* for the Storm Water Quality Task Force (i.e., TC6-*Media Filtration*; ESC10-*Seeding and Planting* and ESC11-*Mulching*); and
(3) All post-construction structural BMPs (or suites of BMPs) for new development have been designed to treat, infiltrate or filter stormwater runoff from each storm event, up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor, for flow-based BMPs.

b. The plan shall include, at a minimum, the following components:

(1) A description of the measures to be used to avoid water quality impacts;
(2) A schedule for installation and maintenance of runoff control devices; and
(3) A plan for the installation of structural and non-structural best management practices.

B. The permittee shall undertake development in accordance with the approved final 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 Commission amendment to this coastal development permit unless the Executive Director determines that no amendment is legally required.

8. Recordation of Deed Restrictions and Project Conditions.

PRIOR TO ISSUANCE OF COASTAL DEVELOPMENT PERMIT NO. A-1-CRC-02-150, the applicant shall submit to the Executive Director for review and approval documentation demonstrating that the applicant has executed and recorded against the parcel(s) governed by this permit a deed restriction, in a form and content acceptable to the Executive Director: (1) indicating that, pursuant to this permit, the California Coastal Commission has authorized development on the subject property, subject to terms and conditions that restrict the use and enjoyment of that property; and (2) imposing the Special Conditions of this permit as covenants, conditions and restrictions on the use and enjoyment of the Property. The deed restriction shall include a legal description of the entire parcel or parcels governed by this permit. The deed restriction shall also indicate that, in the event of an extinguishment or termination of the deed restriction for any reason, the terms and conditions of this permit shall continue to restrict the use and enjoyment of the subject property so long as either this permit or the development it authorizes, or any part, modification, or amendment thereof, remains in existence on or with respect to the subject property.

9. Conditions Imposed By Local Government.

This action has no effect on conditions imposed by a local government pursuant to an authority other than the Coastal Act.

IV. FINDINGS AND DECLARATIONS:

The Commission hereby finds and declares as follows:

A. Project History / Background.

The project site for the approved single-family residential development comprises Lot 3 of the LeMunyon Subdivision, created by parcel map in 1972. The site is one of three blufftop lots

within the subdivision located west of Pebble Beach Drive, a public road located along the western ocean shoreline of the City of Crescent City that extends northward into unincorporated County areas (see Exhibit Nos. 2 and 3).

On August 23, 2001, Tom Kraft, agent-of-record for the Beth M. Forest Trust, submitted Coastal Development Permit Application No. 2001-02 (CDP No. 01-02) to the Crescent City Public Works / Planning Department seeking authorization to construct a single-family residence with attached garage.

After several continued and remanded hearings before the Planning Commission, on October 7, 2002, the City Council of the City of Crescent City approved CDP No. 01-02 for the subject development, denying an appeal of the Planning Commission's August 8, 2002 conditional approval of the project. The Planning Commission attached a number of special conditions, including requirements that: (1) monumentation of the approved building site be performed prior to building permit issuance; (2) final construction plans conform to the approved geotechnical and soils and foundation investigations; (3) prohibit cantilevering of the structure beyond the top of bluff; (4) a new permit be required if the project were to be changed in regards to its approved size, height, foundation or excavations; (5) construction materials not be placed or vegetation removed at or below the bluff top other than from the authorized area of disturbance; (6) construction activities be limited to the period between May 1 and November 1, with all exposed soil areas seeded, landscaped, or mulched by October 1, and the site graded to drain toward Pebble Beach Drive; (7) a deed restriction be recorded acknowledging that the site may be exposed to coastal erosive forces, that the owner assumes all risks and holds harmless the City with respect to these natural hazards, that the landowner waives rights to construct shoreline protective devices, and agrees to inform all subsequent owners, assigns, lessees of the waiver of said rights and assumption of liability; (8) signage be placed along the Preston Island accessway informing coastal users of the presence of a construction zone and urging caution; (9) a five-foot-wide sidewalk, curb, and gutter be constructed to City standards along the parcel's Pebble Beach Drive frontage; and (10) road encroachment, utility, and building permits be secured prior to initiating construction-related ground disturbances.

The decision of the Planning Commission was appealed at the local level to the City Council twice. The first appeal was filed on May 20, 2002 and regarded alleged shortcomings with the public noticing and environmental review requirements for the project under the California Environmental Quality Act (CEQA). The City Council remanded the project to the Planning Commission for further consideration of the appeal issues. A second appeal was filed on August 19, 2002, following the Planning Commission's approval with conditions after conducting the Council-remanded review of project. The second appeal raised concerns relating both to geologic instability and, again, the environmental documentation required under CEQA for the project. The City Council subsequently denied the second appeal and sustained the Planning Commission's conditional approval. The City Clerk issued a Notice of Final Action on October 7, 2002, which was received by Commission staff on October 11, 2002 (see Exhibit No. 8).

The project was appealed to the Coastal Commission in a timely manner on October 25, 2002, within 10 working days after receipt by the Commission of the Notice of Final Local Action. On

December 13, 2002, the Commission found that a Substantial Issue had been raised with regard to the consistency of the project as approved and the applicable policies of the LCP concerning geologic stability of the building site. Specifically, the appeal raised a substantial issue regarding whether the stability of the proposed structures for their full economic life had been assured, as portions of the foundation would have been located within an area of potential slope failure.

The Commission continued the *de novo* portion of the appeal hearing so that the applicant could provide additional information relating to the substantial issue. On January 23, 2003, the applicants amended the project description to move all portions of the residential structure's foundation outside of areas of potential geologic instability on the site based on additional foundation design and engineering information (see Exhibit No. 10).

B. Project and Site Description.

1. Project Setting

This narrow, elongated parcel is approximately 1.7 acres in size and is comprised of a generally flat, roughly 9,000-square-foot grass- and shrub-covered uplifted marine terrace area with scattered tree cover on its east side. To the west, the lot drops abruptly down a rocky bluff face where it is bisected by the access road to the Preston Island Coastal Access Point before extending further down the coastal bluff to the supra-tidal areas. The project parcel is the last remaining vacant residential lot on the ocean side of Pebble Beach Drive to be developed.

Plant cover on the blufftop portion of the parcel where development is proposed is comprised of upland grasses, forbs, and shrubs, including coyotebrush (Baccharis pilularis), salal (Gaultheria shallon), evergreen huckleberry (Vaccinium ovatum), Pacific wax myrtle (Myrica californica) and bracken fern (Pteridium aquilinum). The upper terrace is also dotted with six mature shore pine (Pinus contorta ssp. contorta) along its mid-central portion. The site does not contain any known environmentally sensitive habitat areas.

The project site lies within the incorporated bounds of the City of Crescent City and is subject to the policies and standards of its certified LCP. The subject property is comprised of a vacant parcel designated in the City's General Plan Land Use Map as "Residential" (upper terrace portion) and "Open Space" (shoreline portion). The Coastal Zoning Map indicates the site is located partially within the "Coastal Zone – Single Family Beach" (CZ-R1B) and "Coastal Zone – Open Space" (CZ-O) zoning districts (see Exhibit Nos. 4 and 5). The regulations of the CZ-R1B zoning district recognize single-family dwelling and accessory buildings as the only permitted use, and set more stringent development controls for protecting open spaces and visibility along the City's oceanfront than those imposed by the related "Coastal Zone – Single Family" (CZ-R1) zoning district applied in more inland locations. Most notably, maximum allowable building heights are decreased from 35 feet to 25 feet, minimum side yards are doubled to 10 feet, and maximum allowable fencing heights in front and side yards are reduced from four feet to 2 ½ feet and from six feet to four feet, respectively. The CZ-O zoning regulations restrict development to a series of public recreational, natural resource, and public facility uses, all requiring a conditional use permit.

The subject property is not within a designated highly scenic area, although the property is situated on the ocean side Pebble Beach Drive, a major shoreline road that offers expansive views of the coast between the Crescent City Harbor and Saint George Reef. Views to and along the ocean across the property of the headlands, blue-water areas and offshore sea stacks along Pebble Beach Drive are limited to several openings in the vegetation on the site. More direct and uninhibited views of the coastline are available nearby from the roadway to the Preston Island Coastal Access Point that crosses the property behind the proposed building site, from the Brother Jonathan Vista Point one-half block to the south, and from other vantage points along Pebble Beach Drive.

2. Project Description

As approved by the City, the project entails the construction of a 2,850-square-foot, 13- to 25-foot-height, one- to two-story residence and attached garage (see Exhibit No. 6). Due to its shoreline location and geologic setting, the proposed building site for the development is limited to the more stable, upper terrace portion of the lot abutting Pebble Beach Drive within the CZ-R1B zoning district. The house and garage would be located in the mid-center of the terrace portion of the lot, setback twenty feet from the street frontage. For purposes of the *de novo* review by the Commission, the applicant has submitted a revised project description and plans. The proposed amended design changes the placement of foundation piers. Although the rear portions of the house and garage extend over the blufftop to the bluff edge, the structure would be built with an engineered cantilevered foundation consisting of grade beams and reinforced concrete end-bearing piers located no closer than 10 feet from the bluff edge, outside the area of modeled potential ground failure. Five of the six shore pine trees on the upper parcel would be removed for the proposed building site. Municipal water and sewage services would be provided to the residence by the City.

C. Residential Use

As described in the preceding findings section, the project site is located in a part of the City that has a residential land use plan designation. Further, the portion of the subject property on which the residential use is being proposed lies within a beachfront single-family residential zoning district. One-family residences, along with accessory buildings are identified as the sole principally permitted use under this zoning designation.

The proposed project consists of the construction of a single-family residential structure and attached accessory building. Therefore, the Commission finds that the use is consistent with the use provisions of the land use and zoning designations.

D. Geologic Stability

1. Summary of LCP Provisions

Policy No.3 of LUP Chapter 5 – "Diking, Dredging, Filling and Shoreline Structures" states:

> *The City shall require that new development minimize risks to life and property in areas of high geologic hazard, 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.*

LUP Chapter 5 – "Diking, Dredging, Filling and Shoreline Structures" Policy No.4 continues to state:

> *The City shall approve revetments, breakwaters, groins, harbor channels, seawall, cliff retaining wall, and other such construction that alters natural shoreline processes 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 structure" means a structure in existence on March 14, 2001.*

Policy No.7 of LUP Chapter 5 – "Diking, Dredging, Filling, and Shoreline Structures" states:

> *The City shall include a condition in the approval of all new development on ocean fronting parcels that no shoreline protective structure shall be allowed in the future to protect the development from bluff erosion. Prior to the issuance of a coastal development permit for the development, a deed restriction acceptable to the Planning Director shall be recorded memorializing the prohibition on future shoreline protective structures.*

2. Discussion

The building site for the approved residential development is situated on the margin of an uplifted marine terrace that makes up the northeasterly portion on the project parcel. This roughly flat portion of the subject property comprises approximately 9,000 square feet and abuts Pebble Beach Drive to the northeast and drops roughly 40 feet to the ocean along its southwest margins. The descending bluff face / roadcut is bisected by a revetment-armored access road that leads down to the Preston Island Coastal Access Point.

The LUP's Diking, Dredging, Filling and Shoreline Structures chapter requires that the approving authority review all applications for Coastal Development Permits to ascertain the threats from and contributions to geologic hazards associated with the development. Diking, Dredging, Filling and Shoreline Structures Policy No. 3 requires that all new coastal development in areas of known or potential geologic hazards, such as along the shoreline or on bluff top lots like the project site, be shown to 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. Diking, Dredging, Filling and

Shoreline Structures Policy No. 7 goes further to require that, as a condition of coastal development permit approval of all new development on ocean fronting parcels, a deed restriction be recorded memorializing that no shoreline protective structure be allowed in the future to protect the development from bluff erosion.

A soils engineering and foundation report was submitted with the project application (Tromble Engineering (TE), 2001). In addition, a geotechnical investigation (Busch Geotechnical Consultants (BGC), 2001, 2002) was prepared as a preliminary assessment of stable building sites for a generic residential development at the site (see Exhibit No. 10).

The BGC report went on to address specific geologic stability issues germane to the project site, including:

- Hazards associated with erosion of the soils overlying the blufftop;
- The effects of groundwater or sub-surface aquifers on bluff retreat;
- The effects of repeated seismic shaking and/or blasting associated with past quarrying of rock from Preston Island on site stability;
- Recommended measures to mitigate geologic instability; and
- Limitations on the thoroughness of the geologic investigation and the efficacy of its recommendations due to the preliminary detail of development plans.

Erosion of the Soil Mantle

With regard to the existing bluff slope conditions at the site, the BGC report observed:

> In the southern part of the site, along a foot path to the beach, a narrow gully channeling surface runoff from the bluff exposes weakly consolidated cover sediments. This area is well vegetated and does not pose a threat to the homesite.
>
> In addition, a small cutbank failure is located about 30 ft north of BGC-1, outside of the building footprint (see Figure 4). The sole of this slide is maximally ~13 ft wide. It forms a near vertical scarp ~4 ft high and about 3 ft from the bluff edge. The failure occurred because the cutbank was steeper that the marine terrace sediments and overlying colluvial soils could maintain. [*Site Topography, Geomorphology, and Geology*, p.8; parenthesis in original]
>
> ...(T)he subsoils are mostly well-drained sands overlying high permeable gravels. Although a long duration of intense rain might cause a groundwater table to form in a basal few feet of the marine terrace sediments, our FOS [Factor of Safety] analysis suggests that it is unlikely that the slope will fail in response to temporary elevated water levels. [*Conclusions from Preliminary FOS Analysis*, pp. 15-16]

As to the overall site stability from a regional perspective, the BGC report characterized the project parcel as follows:

> ...[T]he Kraft lot is one of the 'best' (safest) of the bluff-top lots along Pebble Beach. This is because:
>
> (1) The bedrock is an erosion resistant dense sandstone, not a relatively erodible rock type. The bedrock is unlikely to fail and is protected from marine erosion by a road and rocks below.
> (2) The surface of the bedrock is shallow in the building area (it is about 15 ft down versus 30 ft in many other bluff top lots). Consequently, any failure of the overlying marine sands will be small (will bite only a few feet into the lot)...
> (4) Erosion is readily controllable by conventional means. [emphases, and parentheses in original]

Notwithstanding these generally favorable findings, due to amount or severity of precipitation experienced in the Crescent City area, stormwater runoff, in conjunction with other forms of bio-turbation, was identified in the BGC report as a primary factor influencing blufftop slope stability at the project site:

> Of greater relevance is the issue of improperly drained surface water runoff over the edge of the terrace. The small slide scarp along the bluff edge (Figure 4) is indicative of a failure caused by misdirected runoff across an over-steepened road cutbank... [*Conclusions from Preliminary FOS Analysis*, pp. 15-16]
>
> Over the project lifespan (30 to 75 years, depending upon what timeframe is specified), erosion can occur at the Kraft lot due to raindrop impact, running water, burrowing animals, tree fall, foot traffic, and other processes. Collectively, the effects of all of these erosive processes are likely to be minor. More important, the bluff face is unlike to experience slope instability. The base of the bluff is bedrock that is protected from marine erosion by a road that itself is protected...
>
> Existing site-specific hazards and (in parentheses) associated risks of foundation damage exceeding conventional tolerances at the homesite, if the home is built on a conventional shallow foundation with the bluff-top setback shown on Figure 4 and the hazard goes unmitigated are: ...
>
> ➢ soil erosion on bluff face (risk HIGH where bare due to deflation, raindrop impact, and raveling; marine erosion rate zero; overall erosion rate < ½ in/yr [estimate]). [*Summary of Site-Specific Geologic Hazards and Risks*, p. 16; emphases, parentheses, and brackets in original]

BGC concluded that the bluff is eroding at a relatively low average rate of about one-half of an inch per year. Therefore, over a period of 75 years representing the economic life span of a house, the bluff can be expected to erode back approximately three feet. A factor of safety of 1.1 was applied to arrive at the five-foot recommended bluff setback. No additional setback for long-term bluff retreat was deemed necessary since the base of the bluff is not subject to wave attack and since subaerial erosion, other than slumping, appears to be minimal. The report also contained recommendations related to site grading, foundation support, seismic design criteria, concrete slabs-on-grade, and site drainage.

Having reviewed the BGC reports and visited the site, the Commission's staff geologist, Dr. Mark Johnsson, CEG, determined that the applicants' geologist's projection of the bluff retreat rate and the other recommendations were reasonable, but recommended that the slope stability analysis be re-calculated using a 1.5 factor-of-safety coefficient. Based on this input, a new set of slope stability calculations were developed by the applicant's geotechnical consultant. Under the slope stability model using a factor-of-safety coefficient of 1.5, the zone of potential slope failure was found to extend approximately ten feet in from the blufftop edge. Although the applicant's geologist contends that it would not be necessary to set development behind the factor-of-safety of 1.5 line, as the home will rest on a pier foundation embedded into bedrock, no evidence was presented that the proposed piers would be designed to withstand the lateral forces that a slide beneath the structure would produce. As amended for *de novo* review the foundation for the proposed residence would be located outside the zone of potential slope failure determined by using the factor of safety coefficient of 1.5 that could be subject to ground failure associated with a slide of surficial soils during the economic life of the structure.

Geohydrologic-Related Instability

The applicant's geologist also addressed the potential consequences to the development associated with potential groundwater-induced instability at the project site in both the initial BGC report as well as in subsequent report addenda.

In describing the regional hydrogeologic setting, Dr. Busch states:

> Collectively, the presence of a reentrant on the north property line [the gullied area between the Beth Forest Trust and Taylor lots] and a south-sloping bedrock surface south of the property indicate that the bedrock at the site is an ancient sea stack whose top was planed off. The absence of groundwater in the marine terrace sediments further supports this hypothesis (because groundwater approaching the site from inland terrace areas apparently flows around, rather than through, the site). [*Site Topography, Geomorphology, and Geology*, p. 8, parenthesis in original, brackets and emphasis added]

As regards the stratigraphic interface between the overlying terrace soils deposits and the underlying sandstone bedrock where groundwater seepage had been reported on a neighboring lot, in describing the boreholes augered into the blufftop, the original BGC report states:

> The hand auger was refused on gravel. We infer, based on our inspection of the bluff face, that the gravel is the top of a basal lag gravel lens overlying the abrasion platform on bedrock. The nearby road cutbank / bluff face exposes a gray, poorly graded (with well graded zones), fine to coarse sandy gravel (GP-GW) of variable thickness that ranges between 0.5 ft and 2.0 ft that is perched on fractured and jointed Franciscan Fm bedrock. We intercepted no groundwater within [the borehole] and observed no water percolating from the bluff exposure. [parentheses in original, emphasis and brackets added]

The presence, or more accurately, the observed absence of groundwater on the project parcel was further explained in BGC's February 25, 2002 report addendum as follows:

> The top surface of the Franciscan bedrock along Pebble Beach is an ancient (~100,000-yr-old) wave-cut surface. The surface has relief (it isn't flat). Viewed from the beach, the top of the bedrock exposed in the bluff face on the Kraft lot drops down to the north and south. Because there was no groundwater in the sands on the lot when we did our subsurface exploration in November 2000 (*sic*), we suspect the bedrock drops down to the east as well. If so, the bedrock on the lot is a 'knob' or 'hill.' This means that groundwater flowing toward the coast from the east runs around the lot, not through it. This in turn means that the sands on the lot are less likely to fail than sands on nearby lots that seasonally are saturated by groundwater.

Nevertheless, groundwater conditions can change with time. The site visit by BGC occurred in November of a rather dry year. Accordingly, to compensate for such variability, the slope stability analyses submitted in the 20 December 2001 BGC report, and discussed in the soil erosion sub-section above, conservatively assumed saturated conditions. That is, groundwater was assumed to be present to the surface for assessing slope stability.

Thus, the potential of groundwater-induced geologic instability was effectively investigated and considered by the applicant's geologist. These examinations of site conditions factually concluded that, unlike other adjoining parcels subject to bluff slumping and subsidence failures, the applicant's property was not similarly affected by groundwater.

Seismic-Related Instability

The subject of potential geologic instability associated with seismic shaking of the project site from earthquakes and past quarry blasting was addressed by the project engineer and engineering geologist in both the initial TE and BGC reports as well as in subsequent BGC report addenda. Both reports noted that the project site was within one of the most seismically-active regions of California, acknowledged the presence of the Cascadia Subduction Zone offshore of the site, cited the likely exposure of the development to an 8.4 to 8.5 or greater Richter Magnitude earthquake during its economic life, and concurred that these factors underscored the need for deep foundations being used for the residential structures, such as those proposed by the applicant.

The BGC report contains the following statement with respect to overall seismic stability of the site:

> In its present condition, the bluff-top homesite has a LOW risk of slope failure under static ('everyday') conditions. The risk that the home site will landslide under the dynamic conditions of a strong seismic event, e.g., during a Cascadia subduction zone earthquake of M_w 8.0+, as modeled for the Crescent City area, or in response to especially adverse temporary groundwater conditions (saturated soils under high pore pressures), also is LOW. These levels of risk are regionally typical and are acceptable to a prudent person of average economic means...

The December 20, 2001 BGC report includes a pseudostatic slope stability analysis designed to test the stability of the slope during an earthquake. This analysis, undertaken using industry-standard techniques and an appropriate seismic coefficient of 0.15, demonstrated a factor of safety of 1.118 during seismic conditions. A pseudostatic factor of safety of 1.10, when arrived at with a seismic coefficient of 0.15, is generally regarded as adequate to assure stability during seismic conditions.

As a measure to further strengthen the structure's resistance to earthquake damage, the applicant's geologist recommended that the residence be constructed utilizing the more stringent "Zone 4" requirements of the Uniform Building Code (UBC) rather than the Zone 3 standards set for the Crescent City area. Modern criteria for seismic design and construction have been included in the UBC since 1973. Most local agencies within the Pacific states where earthquake damage is a serious concern utilize the UBC as a building code standard. The code requires greater strength for essential facilities and for sites on soft soil where shaking intensity is increased. The code sets minimum requirements that assure life safety but allow earthquake damage and loss of function.

Weaknesses within the rock body underlying the project site or past blasting at the Preston Island quarry that might affect stability at the project were the subject of a separate report prepared by the project's engineering geologist (BGC, 7/29/02) (see Exhibit No. 10). Based on historical research and site examinations at the project site, the remnants of the Preston Island quarry, and the surrounding area, the report concluded that:

- There are no evidence of movement or grinding along the fractures, or significant intra-formational discontinuities (e.g., shear zones) that could act as slope failure slippage zones in the sandstone bedding underlying the project site;

- The lack of remnant dynamite drill holes indicates that no blasting was done on the on the project parcel proper;

- There are no "fresh" fractures within the bedding underlying the project site that would have presumably been formed by blasting at or near the subject parcel;

- The orientation and configuration of the fractures that are present within the bedding at the project site are representative of fractures formed by tectonic processes rather than explosive forces;

- There is a complete absence of fracturing within the overlying terrace deposits that would have represented direct evidence of the site being impacted by nearby blasting; and

- The source of the quarry rock was Preston Island, an isolated landform located off the coast of the project site rather than a promontory extension of the rock body on which the project parcel is situated. Therefore, much of the kinetic energy associated with the blasting at the island would have been propagated through the airspace between the quarry and project sites as pressurizing sound waves that would not have adversely affected stability at the project site to any significant degree.

Thus, the applicant's certified engineering geologist and civil engineer addressed the issue of seismic forces that might affect stability at the project site, by: (1) acknowledging the proximity of significant earthquakes faults and the maximum credible seismic event that might occur along them; (2) estimating the amount of ground acceleration and velocities that might be experienced based on site-specific investigations of the parcel's soils and underlying lithology; and (3) considering the significance of the threat of seismic-related slope failure alongside other geologic forces in a preliminary Factor of Safety (FOS) analysis. Furthermore, both the project engineer and engineering geologist provided specific site and foundation design recommendations to further minimize such impacts.

Development Plan Specificity / Limitations on Geotechnical Analysis

With regard to the completeness of the development details, how they might affect the geotechnical analysis, and the degree to which geologic risks might be mitigated, the BGC report states:

> Currently, the house design is incomplete. However, the owners have made decisions about the general development plan, as discussed in TE (2001). Specifically, they plan to support the home on a reinforced pier and grade beam foundation resting on bedrock (see Figure 5). This decision is prudent because a deep foundation system will be exposed to the lowest risk of damage due to possible soil hazards and bluff failure. Our recommendations address the current development only. **Adherence to our recommendations will reduce—but not necessarily eliminate—risks associated with the identified site-specific soils hazards.** [parentheses and emphasis in original]

Thus, both the TE and BGC reports' conclusions and recommendations were presented as being contingent upon the subsequent preparation of detailed structural plans and engineered foundations.

Identified Mitigation Measures

Together, the Tromble Engineering and Busch Geotechnical reports present a total of 15 recommendations regarding structural and site stability. These include:

- Build the structures on reinforced concrete end-bearing and/or friction piers and grade beams designed by a California-registered engineer;
- Extend the piers a minimum of 18 inches into the underlying bedrock, or deeper if the project engineer determines an enhanced depth is needed to stabilize a particular final design;
- Support interior floors by the grade and beam foundation, allowing for the use of at-grade slabs for habitable areas;
- Set the structure a minimum of five feet back from the edge of the blufftop and a minimum of fifty feet from the northern property line where the reentrant feature is located;
- Design to structure to Uniform Building Code (UBC) Seismic Zone 4 or better guidelines, rather than the Zone 3 standards normally required in the Crescent City area, and utilizing the presumptive bearing values for sedimentary rock plus allowances as given in the current UBC;
- Utilize a combination of short- and long-term erosion control measures to minimize soils loss;
- Install a moisture break and vapor barrier beneath habitable area slabs;
- Provide for back-sloping of all temporary construction cutbanks should a daylight basement be included in the final house designs;
- Have the drilling of the pier borings monitored by the project engineer or engineering-geologist and/or document on the as-built construction plans and certify the drilled depth of any unmonitored boreholes;
- Direct all roof and pavement runoff away from the bluff edge; and
- Follow specified material and construction specifications with regard to the preparing the foundation areas for the residence, garage, and driveway.

As discussed in the preceding sub-section, both the geotechnical and the soils and foundation engineering report findings regarding the stability and safety of the proposed development were

predicated upon the above recommendations being incorporated within final site and building plans.

Conclusion

The Commission finds that repositioning the building's foundation elements to more landward locations to provide a minimum 10-foot setback from the bluff edge proposed under the applicant's amendment for purposes of *de novo* review is a necessary and prudent measure for assuring the project's conformance with the requirements of LUP Chapter 5 – "Diking, Dredging, Filling and Shoreline Structures" Policy No.3 that development "*minimize risk to life and property in areas of high geologic, flood and fire hazard*" and "*assure structural integrity and stability.*" However, as presently proposed, the residential development does not specifically incorporate all recommendations necessary to ensure full consistency with all relevant LCP geologic hazards policies and standards. Therefore, to assure that all at-grade portions of development are located outside of areas of potential instability, the Commission attaches Special Condition No. 1. Special Condition No. 1 requires submittal of final site plans showing the foundation piers for the proposed residence and garage set back a minimum of ten feet from the bluff edge. Special Condition No. 1 also requires the permittee to construct the development consistent with the approved final plans.

In addition to the recommendations relating to setbacks, the BGC geotechnical and TE soils and foundation engineering reports also provide recommendations regarding site preparation, the construction of foundations, slabs, grading, and drainage facilities to accommodate the geologic characteristics and hazards of the site. To assure that these recommendations are incorporated within final site and building plans, and any geologic risks to or from the development in its final form that were not considered in the preliminary geotechnical and engineering analyses are addressed, the Commission attaches Special Condition No. 2. Special Condition No. 2 requires submittal of final foundation, construction, and site drainage plans that incorporate all recommendations of the geotechnical and engineering reports intended to avoid creating a geologic hazard. This condition also requires the applicant to have all approved final design, construction, and drainage plans certified by an appropriately qualified professional as being consistent with all of the recommendations specified in the above-referenced geotechnical and soils & foundation engineering reports approved for the project site and that the development proceed consistent with the approved plans.

The Commission also attaches Special Condition No. 3 which prohibits the construction of shoreline protective devices on the parcel and requires that the landowner provide a geotechnical investigation and remove the house and its foundation if bluff retreat reaches the point where the structure is threatened and that the applicant accept sole responsibility for the removal of any structural debris resulting from landslides, slope failures, or erosion of the site.

These requirements are consistent with LUP Chapter 5 Policies 3 and 4, which state that: (1) new development shall minimize risk to life and property in areas of high geologic, flood, and fire hazard, assure structural integrity and stability, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding areas, nor in any way require the construction of protective devices that would substantially alter natural landforms

along bluffs and cliffs; and (2) the approval of shoreline protective structures be limited to those needed to protect structures in existence on May 14, 2001. The Commission finds that the proposed development could not be approved as being consistent with the LUP's Diking, Dredging, Filling, and Shoreline Structures policies if projected bluff retreat would affect the proposed house and necessitate construction of a seawall to protect it.

The applicants are proposing to construct a new house. Although the house will be located on a coastal terrace 40 to 50 feet above and well-removed from the shoreline surf zone and protected by an intervening revetment-armored roadway, it is nonetheless subject to grain-by-grain erosion at its bluff face from a combination of precipitation runoff, foot traffic, and bio-turbation. Thus, the house would be located in an area of high geologic hazard. The new development can only be found consistent with the above-referenced LCP provisions if the risks to life and property from the geologic hazards are minimized and if a protective device would not be needed in the future.

The applicants have submitted information from a geologist which states that if the at-grade portions of the new development are set back 10 feet from the bluff edge, the development would be safe from erosion and would not require any devices to protect the proposed development during its useful economic life. Although a comprehensive geotechnical evaluation is a necessary and useful tool that the Commission relies on to determine if proposed development is appropriate at all on any given blufftop site, the Commission finds that a geotechnical evaluation alone is not a guarantee that a development will be safe from bluff retreat. It has been the experience of the Commission that in some instances, even when a thorough professional geotechnical analysis of a site has concluded that a proposed development will be safe from bluff retreat hazards, unexpected bluff retreat episodes that threaten development during the life of the structure sometimes still do occur. Examples of this situation include:

- The Kavich Home at 176 Roundhouse Creek Road in the Big Lagoon Area north of Trinidad (Humboldt County). In 1989 the Commission approved the construction of a new house on a vacant blufftop parcel (Permit 1-87-230). Based on the geotechnical report prepared for the project it was estimated that bluff retreat would jeopardize the approved structure in about 40 to 50 years. In 1999 the owners applied for a coastal development permit to move the approved house from the blufftop parcel to a landward parcel because the house was threatened by 40 to 60 feet of unexpected bluff retreat that occurred during a 1998 *El Niño* storm event. The Executive Director issued a waiver of coastal development permit (1-99-066-W) to authorize moving the house in September of 1999.

- The Denver/Canter home at 164/172 Neptune Avenue in Encinitas (San Diego County). In 1984 the Commission approved construction of new house on a vacant blufftop lot (Permit 6-84-461) based on a positive geotechnical report. In 1993, the owners applied for a seawall to protect the home (Permit Application 6-93-135). The Commission denied the request. In 1996 (Permit Application 6-96-138), and again in 1997 (Permit Application 6-97-90) the owners again applied for a seawall to protect the home. The Commission denied the requests. In 1998, the owners again requested a seawall (Permit Application 6-98-39) and

submitted a geotechnical report that documented the extent of the threat to the home. The Commission approved the request on November 5, 1998.

- The Bennett home at 265 Pacific Avenue, Solana Beach (San Diego County). In 1995, the Commission approved a request to construct a substantial addition to an existing blufftop home (Permit 6-95-23). The minimum setback for the area is normally 40 feet. However, the applicants agreed to waive future rights to shore/bluff protection if they were allowed to construct 25 feet from bluff edge based on a favorable geotechnical report. The Commission approved the request on May 11, 1995. In 1998, a substantial bluff failure occurred, and an emergency permit was issued for a seawall. The follow-up regular permit (No. 6-99-56) was approved by Commission on May 12, 1999. On August 18, 1999, the Commission approved additional seawall and upper bluff work on this and several other properties (Permit No. 6-99-100).

- The McAllister duplex at 574 Neptune Avenue, Encinitas (San Diego County). In 1988, the Commission approved a request to construct a duplex on a vacant blufftop lot (Permit No. 6-88-515) based on a favorable geotechnical report. By October 1999, failure of the bluff on the adjoining property to the south had spread to the bluff fronting 574 Neptune. An application is pending for upper bluff protection (Permit No. 6-99-114-G).

- The Arnold project at 3820 Vista Blanca in San Clemente (Orange County). Coastal development permit (Permit No. 5-88-177) for a blufftop project required protection from bluff top erosion, despite geotechnical information submitted with the permit application that suggested no such protection would be required if the project conformed to 25-foot blufftop setback. An emergency coastal development permit (Permit No. 5-93-254-G) was later issued to authorize blufftop protective works.

The Commission notes that the examples above are not intended to be absolute indicators of bluff erosion on the subject parcel, as coastal geology can vary significantly from location to location. However, these examples do illustrate that site-specific geotechnical evaluations cannot always accurately account for the spatial and temporal variability associated with coastal processes and therefore cannot always absolutely predict bluff erosion rates. Collectively, these examples have helped the Commission form it's opinion on the vagaries of geotechnical evaluations with regard to predicting bluff erosion rates.

The BGC geotechnical report states that their geological and engineering services and review of the proposed development was performed in accordance with the usual and current standards of the profession, as they relate to this and similar localities. Nonetheless, the concluding language in the report underscores the underlying uncertainties of this and any geotechnical evaluation and supports the notion that no guarantees can be made regarding the safety of the proposed development with respect to bluff retreat:

> Although we believe our report accurately characterizes site soils and conditions in the building area, and that it anticipates adverse conditions as they might affect risks, the region is subject to great storms and earthquakes and we therefore

> cannot preclude the possibility of a catastrophe. By necessity, the current and all future owners of this property must assume the risks associated with any 'act of God' and hold harmless their realtors, professional consultants, contractors and involved regulatory agencies.

Geologic hazards are episodic, and bluffs that may seem stable now may not be so in the future. Therefore, the Commission finds that the subject lot is an inherently hazardous piece of property, that the bluffs are clearly eroding both at its margins and underneath the landform, and that the proposed new development will be subject to geologic hazard and may someday require a bluff or shoreline protective device, inconsistent with Policy No.3 of Chapter 5 of the LUP. Based upon the geologic report prepared by the applicant and the evaluation of the project by the Commission's staff geologist, the Commission finds that the risks of geologic hazard are minimized if the residence's foundation is set back 10 feet from the bluff edge.

However, given that the risk cannot be eliminated and the geologic report does not assure that shoreline protection will never be needed to protect the residence, the Commission finds that the proposed residence is consistent with the certified LCP only if it is conditioned to provide that shoreline protection will not be constructed. Thus, the Commission further finds that due to the inherently hazardous nature of this lot, the fact that no geology report can conclude with any degree of certainty that a geologic hazard does not exist, the fact that the approved development and its maintenance may cause future problems that were not anticipated, and because new development shall not engender the need for shoreline protective devices, it is necessary to attach Special Condition No. 3 prohibiting the construction of seawalls and Special Condition No. 4 waiving and liability against the Commission associated with its approval of the development..

As noted above, some risks of an unforeseen natural disaster, such as an unexpected landslide, massive slope failure, erosion, etc. could result in destruction or partial destruction of the house or other development approved by the Commission. In addition, the development itself and its maintenance may cause future problems that were not anticipated. When such an event takes place, public funds are often sought for the clean up of structural debris that winds up on the beach or on an adjacent property. As a precaution, in case such an unexpected event occurs on the subject property, the Commission attaches Special Condition No. 3(A)(2) which requires the landowner to accept sole responsibility for the removal of any structural debris resulting from landslides, slope failures, or erosion on the site and agree to remove the house should the bluff retreat reach the point where a government agency has ordered that the structure not be occupied.

The Commission finds that Special Condition No. 3 is required to ensure that the proposed development is consistent with the LCP and that recordation of the deed restriction will provide notice of potential hazards of the property and help eliminate false expectations on the part of potential buyers of the property, lending institutions, and insurance agencies that the property is safe for an indefinite period of time and for further development indefinitely into the future or that a seawall could be constructed to protect the development.

Additionally, the Commission attaches Special Condition No. 4, which requires the landowner to assume the risks of extraordinary erosion and geologic hazards of the property and waive any

claim of liability on the part of the Commission. Given that the applicants have chosen to implement the project despite these risks, the applicant must assume the risks. In this way, the applicant is notified that the Commission is not liable for damage as a result of approving the permit for development. The condition also requires the applicant to indemnify the Commission in the event that third parties bring an action against the Commission as a result of the failure of the development to withstand hazards. Special Condition No. 8 requires that the applicant record a deed restriction that records the special conditions of the permit as covenants, conditions, and restrictions on the use and enjoyment of the property, including the above-referenced assumption of risk condition. This condition requiring the applicant to record a deed restriction will ensure that future owners of the property will be informed of the risks, the Commission's immunity from liability, and the indemnity afforded the Commission.

Finally, the Commission also attaches Special Condition No. 6 which sets additional permit requirements for future development at the site. Section 30610(a) of the Coastal Act and Chapter 17.38 of the City's Coastal Zone Zoning Regulations exempt certain additions to existing single-family residential structures from coastal development permit requirements. Thus, once the permitted development has been constructed, certain additions that the applicant might propose in the future could be exempt from the need for a permit or permit amendment. Depending on its nature, extent, and location, such an addition or accessory structure could contribute to geologic hazards at the site. For example, installing a landscape irrigation system on the property in a manner that leads to saturation of the bluff would increase the potential for landslides or catastrophic bluff failure. Another example would be development of a building addition within the recommended bluff setback. An addition in the bluff setback area would be at risk of damage from bluff retreat.

To avoid such impacts to coastal resources from the development of otherwise exempt additions to existing structures, Section 30610(a) requires the Commission to specify by regulation those classes of development that involve a risk of adverse environmental effects and require that a permit be obtained for such improvements. Pursuant to Section 30610(a) of the Coastal Act, the Commission adopted Section 13250 of Title 14 of the California Code of Regulations (CCR). CCR Section 13253(b)(6) goes on to specifically authorize the Commission to require a permit for additions to structures that could involve a risk of adverse environmental effect by indicating in the development permit issued for the original structure that any future improvements would require a development permit. As noted above, certain additions or improvements to the approved structure could involve a risk of creating geologic hazards at the site.

Therefore, in accordance with provisions of CCR Section 13253(b)(6), the Commission attaches Special Condition No. 6 requiring all future development on the subject parcel that might otherwise be exempt from coastal permit requirements obtain an amendment or coastal development permit. This condition will allow future development to be reviewed by the Commission to ensure that future improvements will not be sited or designed in a manner that would result in a geologic hazard. As stated above, to ensure that adequate constructive notice of the various waivers, acknowledgements, and additional restrictions is provided, the Commission attaches Special Condition No. 8. Special Condition No. 8 requires recordation of a deed restriction that records the special conditions of the permit as covenants, conditions, and

restrictions on the use of the property including the restriction on future development of the property. Special Condition No. 8 will thus ensure that all future owners of the property are aware of the prohibition against the building of future seawalls or other shoreline protective structures at the site, the assumption of risks inherent with development of the site, the acceptance of related liabilities, and the requirement to obtain a permit for development that would otherwise be exempt. This requirement will reduce the potential for future landowners to make improvements to the structures without first fully considering the potential risks and liabilities associated with such development and obtaining the coastal development permit that would be required for such work.

The Commission thus finds that the proposed development, as conditioned, is consistent with the policies of the certified LCP regarding geologic hazards, including Diking, Dredging, Filling and Shoreline Structures Policies Nos. 3, 4, and 7, as the proposed development as conditioned would not result in the creation of any geologic hazards, would not have adverse impacts on the stability of the coastal bluff or on erosion, and the Commission will be able to review any future additions to the site to ensure that development will not be located where it might result in the creation of a geologic hazard. Only as conditioned is the proposed development consistent with the LCP policies on geologic hazards.

E. Protection of Environmentally Sensitive Habitat Areas and Water Quality From Storm Water and Polluted Runoff Impacts

1. Summary of LCP Provisions

Policy No.2 of LUP Chapter 4 "Environmentally Sensitive Habitat Areas / Water and Marine Resources" states, in applicable part:

> *The City shall protect those areas that are designated as environmentally sensitive so that these habitats and their resources are maintained and development shall be consistent with adjacent areas and with Section 30240 et seq. of the California Coastal Act...*

Referenced Coastal Act Section 30240 reads as follows:

> *(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.*

LUP Chapter 4 – "Environmentally Sensitive Habitat Areas / Water and Marine Resources," includes within its list of environmental sensitive habitats, "*Inter-tidal areas (Preston Island to North Breakwater).*"

Policy No.2 of LUP Chapter 7 – "Public Works" reads as follows:

> *The City shall require that best management practices (BMPs) for controlling stormwater runoff and maintaining water quality be incorporated into development design and operation. All post-construction structural BMPs (or suites of BMPs) for new development, including but not limited to, recreational or visitor-serving commercial development within Coastal Zone - Commercial Waterfront zoning districts, shall be designed to treat, infiltrate or filter stormwater runoff from each storm event, up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor, for flow-based BMPs.*

2. Discussion

The project site is located adjacent to the inter-tidal areas between Preston Island and the North Breakwater of the Crescent City Harbor. This nearshore area is listed as an environmentally sensitive habitat area (ESHA) within the certified LCP. Policy No.2 of the LUP's "Environmentally Sensitive Habitat Areas / Water and Marine Resources" chapter calls for the protection of ESHAs such that their habitat and resources are maintained. Storm water runoff from new residential development can adversely affect the biological productivity of coastal waters by degrading water quality. New development must also be found consistent with adjacent areas as detailed in the Land Resources article of Coastal Act Chapter 3.

In addition to physically siting and designing new development to protect against significant disruptions to habitat values, degradation, and to be compatible with their continuance as habitat and recreational areas, Policy No. 2 of the LUP's "Public Works" chapter directs that the City require new development to proactively control stormwater runoff and maintain water quality by incorporating appropriate best management practices (BMPs) into development plans and operations. To this end, all post-construction structural BMPs (or suites of BMPs) for new development must be designed to treat, infiltrate or filter stormwater runoff from each storm event, up to and including the 85th percentile, 24-hour storm event for volume-based BMPs, and/or the 85th percentile, 1-hour storm event, with an appropriate safety factor, for flow-based BMPs.

As discussed above, the rear of the building site is located on the section of the coastal terrace portion of the lot that slopes gently to the west and south toward the coastal bluff. The building envelope extends to the coastal bluff, with the foundation piers setback ten feet from the blufftop edge. Therefore, under existing site conditions, runoff originating from the development site would generally drain toward the bluff edge. Sediment and other pollutants entrained in runoff from the development that reaches the coastal waters surrounding Preston Island and any intervening ESHA could contribute to degradation of the quality of marine waters and associated

sensitive habitat areas. As conditioned by Special Condition No. 2, the development has been required to abide by the recommendations of the approved geotechnical and soils & foundation engineering reports. Among these recommendations is the direction to collect and convey all runoff from impervious surfaces and grade the site so as to drain away from the blufftop. Although established primarily to avoid exacerbating bluff stability, the condition would also serve to prevent the erosion and entrainment of bluff face soils in stormwater runoff, greatly reducing the potential for the completed development to adversely affect ocean water quality and ESHAs.

However, merely redirecting site runoff away from the bluff edge to avoid erosion of its soil materials will not, in itself, eliminate stormwater-borne contaminants from leaving the upper terrace building site. Though not individually significant, urban runoff from each house, garden, driveway, and access road can cause serious damage to water quality of the surrounding area from a cumulative perspective. Unless intercepted, sediments from construction and vegetated areas, pesticides and fertilizers from landscaping, solvents and detergents from car washing and minor home maintenance, heavy metals, oil, grease, and gasoline from motorized vehicles, and trash and particulate debris from inappropriate solid waste disposal can become entrained in stormwater leaving the site that would eventually make its way into shoreline environmentally sensitive areas and coastal waters.

Sedimentation impacts from runoff would, however, be of greatest concern during the project's construction phase. Construction of the proposed site improvements would disturb a relatively large area of vegetation that would expose soil to erosion and entrainment in runoff, particularly during the rainy season. Consistent with the above-listed LUP policies, Special Condition No. 7 has been imposed to minimize erosion and sedimentation impacts from both the construction of the development as well as the on-going residential uses at the site. Special Condition No. 7 requires the applicant to prepared and submit an erosion and runoff control plan for the review and approval of the Executive Director. The plan is to identify specific water quality best management practices designed to specified standards to minimize erosion and control runoff from the site such that polluted water runoff is prevented from entering coastal waters and impacting shoreline ESHAs. BMPs required to be included within the plan include: (1) measures to assure that construction materials and supplies are properly stored and used so not as to cause releases of hazardous substances; (2) restricting construction activities to the mid-April through mid-October dry season; (3) retention of existing vegetation; (4) use of sediment control barriers around disturbed areas during construction; (5) incorporation of in-line interceptor filtration media within the impervious surface runoff conveyance system; (6) installation of landscaping in open areas on the site; and (7) seeding and/or mulching bare-ground areas following the completion of site construction.

Adherence to this requirement will ensure that polluted runoff, directed away from geologically unstable portions of the site and toward the street stormwater drainage facilities, undergoes treatment to remove these pollutants and the contaminants are not simply being discharged to the ocean or into associated environmentally sensitive areas by another route.

Thus, as conditioned, the Commission finds that the project is consistent with LUP Chapter 7, Policy No.2, as the project is required to include appropriately formulated best management practices (BMPs) for controlling stormwater runoff and maintaining water quality. The Commission further finds that with the BMPs for controlling stormwater runoff and maintaining water quality, the project as conditioned will be designed and sited to protect the adjacent inter-tidal habitat and coastal waters from the impacts of the development and maintain habitat values consistent with Policy No. 2 of LUP Chapter 4.

F. Public Access and Recreation.

1. Summary of Coastal Act and LCP Provisions

a. Coastal Act Access Policies

Projects located between the first public road and the sea and within the coastal development permit jurisdiction of a local government are subject to the coastal access policies of both the Coastal Act and the LCP. Coastal Act Sections 30210, 30211, and 30212 require the provision of maximum public access opportunities, with limited exceptions. Section 30210 states that maximum access and recreational opportunities shall be provided consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse. Section 30211 states that development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation. Section 30212 states that public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where it is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, adequate access exists nearby, or agriculture would be adversely affected.

b. LCP Provisions

LUP Chapter 1 – "Public Access" Policy No.1 states, in applicable part:

> *The City recognizes the importance of access to and along the shoreline... If, in the future, the City finds that existing public accessways are inadequate to meet recreational needs, it shall encourage the development of additional accessways consistent with the City's ability to pay maintenance costs and obtain adequate funding to develop said areas.*

LUP Chapter 1 – "Public Access" Policy No.3 states, in applicable part:

> *The City shall assure that the public can easily locate existing access points... The present access points are identified in the General Conditions section of this element and are again identified as: Preston Island, Sixth Street, Third Street, Fifth Street, Battery Point, Howe Drive, and Sunset Circle.* [emphasis added]

LUP Chapter 2 – "Recreation and Visitor-Serving Facilities" Policy No.1 states:

The City of Crescent City shall assure the preservation of areas which are zoned Open Space in a manner consistent with the uses allowed in Open Space areas.

Coastal Zone Zoning Regulations Section 17.71.020 identifies the following conditional uses[1] within the Coastal Zone Open Space zoning district:

- *Parks and playgrounds*
- *General open areas*
- *Wildlife preserves*
- *Geologic feature preservation*
- *Public buildings and facilities*
- *Drainage channels and channels*
- *Water reservoirs, watersheds, and recharging basins*
- *Vista areas*
- *Beaches*
- *Publicly operated recreational establishments*
- *Historic and cultural sites*
- *Marinas*
- *Flood control devices*

3. Discussion

In its application of these policies, the local government and the Commission are limited by the need to show that any denial of a permit application based on this section, or any decision to grant a permit subject to special conditions requiring public access is necessary to avoid or offset a project's adverse impact on existing or potential access.

As described more fully in Findings Section IV.B above, the project site lies within the Coastal Zone Single-Family Beach (CZ-R1B) zoning district that runs along the west side of Pebble Beach Drive between Condor and North Streets in northwestern Crescent City. The site is bordered immediately on the south and west by lands zoned Coastal Zone Open Space (CZ-O). Properties to the east of the subject site across Pebble Beach Drive, though outside the coastal zone, have comparable single-family residential zoning.

The LUP identifies eight coastal access points within the bounds of Crescent City. Table 1, below, summarizes the location and features of these beach access points:

Table 1: Inventory of Crescent City Coastal Access Points

Facility Name	Location	Distance from Project Site	Features
Preston Island	Northwest Oceanfront	Immediately seaward of the building site	Paved vertical accessway leading to ½-¾ mi. of lateral access along Pebble Beach, developed with numerous off-street parking spaces, picnic tables, and litter receptacles

[1] The CZ-O zoning district identifies no principally permitted use.

Facility Name	Location	Distance from Project Site	Features
Sixth Street	Western Street End	±⅞ mi. to southeast	Improved footpath providing access to beach below Halls Bluff with limited on-street parking (4 spaces)
Fifth Street	Western Street End	±1 mi. to southeast	Unimproved footpath entry to ¾-1 mi. lateral access to beach areas between Halls Bluff and Battery Point with very limited on-street parking (1-2 spaces)
Fourth Street	Western Street End	±1⅛ mi. to southeast	Unimproved footpath entry to ¾-1 mi. lateral access to beach areas between Halls Bluff and Battery Point with very limited on-street parking (1-2 spaces)
Third Street	Western Street End	±1¼ mi. to the southeast	Unimproved footpath entry to ¾-1 mi. lateral access to beach areas between Halls Bluff and Battery Point with very limited on-street parking (1-2 spaces)
Battery Point	Southwest Oceanfront	±1¾ mi. to south	Paved accessway to Battery Point Lighthouse and Museum, and "B" Street Pier developed with approximately 40 off-street parking spaces, restrooms, picnic tables, and interpretive displays.
Howe Drive	Northwest of Harbor	±1½ mi. to southeast	Public road along southern side of Beachfront Park providing 2,000 feet of direct unimproved access to the Crescent City Harbor
Sunset Drive	Northeast of Harbor	±2 mi. to southeast	Public road along eastern side of southern side of Crescent City Harbor providing access the mouth of Elk Creek and harbor through a dedicated 50-ft-wide right-of-way across private RV park

Additionally, though not incorporated as a standard of the City's LCP, the County of Del Norte Coastal Access Inventory identifies three other access facilities, as summarized in Table 2, within a similar proximity to the north of the project site:

Table 2: County of Del Norte Coastal Access Points in the Project Vicinity

Facility Name	Location	Distance from Project Site	Features
Point Saint George	Headland Oceanfront	±2 mi. to northwest	Paved vertical accessway leading to ½-¾ mi. of lateral access along Pebble Beach, developed with numerous off-street parking spaces, picnic tables, and litter receptacles
North Beach	North end of Pebble Beach	±1¾ mi. to northwest	Improved footpath providing access to beach below Halls Bluff with limited on-street parking (4 spaces)
Pebble Beach	Near Pacific Avenue	±¼ mi. to northwest	Southern stairway entry to ±1 mi. lateral access, with very limited on-street parking (1-2 spaces)

Two of these beach access points are available for use within a reasonably short distance (±¼ mile) from the project site. In fact, a part of one of these access facilities, the road access to the Preston Island Coastal Access Point, lies on the subject property at the rear of the street side building site where it traverses the bluff down to this shoreline recreational site. No portion of the development would be sited in such a location or manner as to obstruct or otherwise interfere with the public's ability to easily access the Preston Island Coastal Access Point or any of the other existing coastal access facilities within the City.

The proposed single-family residence would not significantly effect the protection of Open Space-zoned areas adjoining the project parcel. With regards to new development being consistent with the uses allowed in CZ-O areas, the proposed single-family residential development would occur on a portion of the project parcel well-removed from any of the enumerated uses or facilities existing on the adjoining CZ-O zoned lands. The adjoining CZ-O areas consist of the adjoining Preston Island Access Point, comprising in part the western two-thirds of the subject parcel, and the Brother Jonathon Vista Point off of Pebble Beach Drive to the south of the project site. Both of these areas are popular sites for several of the coastal recreational uses listed in CZZO Section 17.71.010 and function as parks, vista points, general open space, and/or public beaches. In addition, given the past quarry use at the Preston Island site and the proximity of the shipwreck location from the vista point, these areas would also be considered historical and cultural sites.

The proposed development and its subsequent single-family residential use, with the addition of special conditions to prevent impacts to water quality, environmentally sensitive areas, and visual resources, would not encroach, interfere, degrade, place undue demands upon, or otherwise distract from the public recreational, natural resource, or public facility uses and attractions at the Preston Island Access Point or the Brother Jonathon Vista Point. Therefore, the Commission finds that the proposed development as conditioned would conform to the requirements of LUP Chapter 2 – "Recreation and Visitor-Serving Facilities" Policy No.1 that

the preservation of Open Space-zoned areas be assured in a manner consistent with the uses allowed in such areas.

No public access is proposed for the portion of the property where development is proposed. As the site is presently vacant, it is physically possible to walk across the lot. However, the City land use maps do not designate the upper terrace portion of the subject parcel for public access, and there does not appear to be any safe vertical access to the rocky shore down the steep and thickly vegetated bluffs. According to the City, there is no evidence of public prescriptive use of the subject site, and so the City did not instigate a prescriptive rights survey. Since public access to the shoreline already exists on the property, the proposed development would not significantly increase the demand for public access to the shoreline and the project would have no other significant adverse impacts on existing or potential public access. Therefore, the Commission finds that the proposed project, which does not include provision of additional new public access, is consistent with the public access policies of the Coastal Act and the City's LCP.

G. Visual Resources.

1. Summary of LCP Provisions

LUP Coastal Visual Resources and Special Communities Policy No. 1 states, in applicable part:

> *The City shall encourage the maintenance of the visual and scenic beauty of Crescent City...*

LUP Coastal Visual Resources and Special Communities Policy No. 4 states, in applicable part:

> *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 designated highly scenic areas shall be subordinate to the character of its setting...*

Section 17.66.010 of the City's Coastal Zone Zoning Regulations states the purpose of the prescriptive development standards for the Coastal Zone Single-Family Beach zoning district as:

> *The purpose of this chapter is to increase the restrictions placed on CZ-R1 property for the purpose of providing greater open space and visibility, while still permitting equal opportunities for developers of residential property similar to others within the community.*

2. Discussion.

The above LCP policies and standards provide for the regulation of new development to protect views to and along the ocean and scenic coastal areas. To this end, development is to be sited and designed to protect such views, be found visually compatible with the character of the surrounding areas, and alterations of natural landforms must be minimized. Furthermore, in designated highly scenic areas the development must be found to be subordinate to the character of its setting. The LCP does not designate the project site as a highly scenic area (the City's LCP does not make that distinction for any specific sites, but focuses instead on protecting views within the "scenic highway corridor" visible from Highway 101 at the City's southern entrance). However, the Pebble Beach Drive setting for the proposed residence is an area of notable visual interest and scenic qualities.

a. Protecting Coastal Views

As no site improvements are developed on the project property, coastal viewing opportunities currently exist laterally along the entire approximately 735-foot street frontage of the property. Though impressive where they can be observed, coastal views for motorists through the portion of the project site slated for development from Pebble Beach Drive are somewhat fleeting due to the upsloping topography, vegetation, and presence of adjoining residential structures in the area which limit the expanse of ocean vistas. The primary views along this portion of the City's northwestern oceanfront that need to be considered and protected are the oblique views to the nearshore "blue-water" and the landforms of Halls Bluff and Pebble Beach to the south and north respectively of the project site. When compared to other portions of the coast visible from the site, the Halls Bluff landform (Brother Jonathon Point) is the most visually prominent feature in the area. Views of this area typically include surf crashing onto the offshore rocks and in-flight marine birds transiting the shoreline between the Castle Rock and Whaler Island rookeries. In addition, the remnants of the Preston Island quarry, located directly to the west of the project site, are visible in the foreground of this vista.

The construction of a 2,850-square-foot, 13- to 25-foot-height, one- to two-story single-family residence with attached garage would introduce a significant new structure into the viewshed of this scenic area. The proposed residence would be visible from several public streets and recreational areas both within the City and in surrounding County areas.

The proposed residence would be constructed on the roughly 9,000-square-foot blufftop portion of the lot. This portion of the property lies at a mean elevation of approximately 48 feet above mean sea level (msl) and has an approximately 370-foot frontage along Pebble Beach Drive. The terrace portion slopes up and away from the street frontage, cresting at a height of between two and four feet above the grade of the road. As a result, blue-water and offshore sea stack views to and along the ocean across the property from Pebble Beach Drive are limited to several openings on the site where vegetation is low-lying.

Any above-grade development at the site will inevitably affect some of the views along Pebble Beach Drive in the vicinity of the project site. However, in determining consistency with the applicable visual resource policies and standards, the relative degree and manner in which the

development would affect public coastal views is considered rather than whether the mere presence of the development would affect visual resources.

With respect to compliance with the policies and standards regarding the protection of views to and along the ocean and scenic coastal areas, the 114-foot width of the proposed house and garage would span approximately 30% of the frontage of the terrace portion of the parcel leaving approximately 255 feet unobstructed by above-grade improvements. Furthermore, the development would only obstruct about 16% of the full ±735-foot width of the property. By necessity, the approved home site would be located on the most stable (i.e., widest) portion of the upper terrace near its center. As a result, two view corridors representing 70% of the lots street level width would remain unobstructed by any above-grade improvements on either side of the proposed residence.

Furthermore, as described in the Site and Project Description Finding Section IV.B, opportunities to view the shoreline would remain available along the southern half of the parcel beyond the Preston Island access road at the rear of the proposed residence, from the Preston Island Coastal Access Point proper, and from the Brother Jonathan Vista Point immediately adjoining the property to the south. The majority of Pebble Beach Drive in this area fronts onto bluff without any intervening parcels between the street and the bluff. As a result, these portions of Pebble Beach Drive afford sweeping views of the ocean and coast that would not be affected by the approved development. Thus, with respect to interference with or loss of views, the impacts of the proposed development are not significant.

Accordingly, the Commission concludes that the proposed new development as conditioned has been sited and designed to protect views to and along the coast consistent with LUP Coastal Visual Resources and Special Communities Policies Nos. 1 and 4. Furthermore, the Commission concludes that, as conditioned by Special Conditions No. 6 to require any future development be reviewed to ensure that it will be sited and design so as not to have significant adverse effects on visual resources, any such future proposed new development would likewise protect views to and along the coast.

b. Minimizing Landform Alteration

Some minor alterations of natural landforms would likely result from development of the residential structures. Establishing building sites, accessways, parking facilities and utility placement would require the clearing of grass-covered areas, shrubs, trees, and grading that would result in observable modifications to the current terrain at the site. However, as described in Project Description Finding IV.B.2, the construction of the site improvements would be restricted to an approximate 3,000-square-foot area of disturbance that has only minor sloped relief and no remarkable landform present. Therefore, the Commission concludes that construction of the project as proposed would minimize landform alteration consistent with LUP Coastal Visual Resources and Special Communities Policy No. 4.

c. Visual Compatibility of New Development

Finally, Policy No.4 requires that new development be found to be visually compatible with the character of surrounding areas. With respect to making this finding, the character of the area surrounding the project site may best be described as "diverse." The property lies near the junction of single- and two-family residential and open space zoning districts. Given the variety of residential building types, styles, sizes, heights, colors, and coverages that currently exist or would be allowed on adjoining properties by the City's zoning regulations, the construction of the proposed residence cannot, from a strictly architectural point of view, be determined to be out of character with the surrounding area.

Furthermore, the proposed 25-ft. overall height would be less than that of many nearby homes, and the development would not project higher than the estimated 30- to 50-ft.-height of the Monterey cypress (Cupressus macrocarpa) and Sitka spruce (Picea sitchensis) trees that exist along the west side of Pebble Beach Drive to the north and south. Notwithstanding these features, the proposed residence would represent a major structural development for the area and would be especially prominent if the residence were built with materials and lighting fixtures that produced excessive glare. To lessen the visual prominence of the development, the Commission attaches Special Condition No. 5. Special Condition No. 5 requires that all exterior materials, including roofs and windows, shall be non-reflective to minimize glare. In addition, all exterior lights, including lights attached to the outside of any structures, must be low-wattage, non-reflective and be mounted so as to cast their illumination downward to minimize glare and lighting impacts. As conditioned, the project would be compatible with the character of surrounding development and the surrounding area, consistent with LUP Coastal Visual Resources and Special Communities Policy No. 4.

Conclusion

Therefore, the Commission finds that as: (1) views to and along the ocean have been protected through retention of major portions of the project site's frontage along Pebble Beach Drive, and the availability of views toward the shoreline from public-accessible vantage points seaward of and adjacent to the building site; (2) natural landform alteration would be minimized; and (3) the new development would be visually compatible with the character of surrounding areas, the proposed project as conditioned is consistent with LUP Chapter 2, Policies Nos. 1 and 4.

H. California Environmental Quality Act (CEQA).

Section 13096 of the Commission's administrative regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing the application, as modified 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 which the activity may have on the environment.

The Commission incorporates its findings on conformity with LCP policies 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 herein, in the findings addressing the consistency of the proposed project with the certified LCP, the proposed project has been conditioned to be consistent with the City of Crescent City LCP and the access and recreation policies of the Coastal Act. Mitigation measures which will minimize all adverse environmental impacts have been made requirements of project approval. 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 can be found to be consistent with the requirements of the Coastal Act to conform to CEQA.

V. EXHIBITS:

1. Regional Location Map
2. Vicinity Map
3. County of Del Norte Assessors Parcel Map 118-30
4. Portion, Land Use Plan
5. Portion, Zoning Map; Coastal Zone Single-Family Beach (CZ-R1B) Zoning District Regulations
6. Site Plan, House and Garage Elevations, Floor Plans
7. Applicant's Agent's Letter Regarding Project Revisions for Commission's *De Novo* Review
8. Notice of Final Local Action
9. Appeal, filed October 25, 2002 (Campbell, Lewis, Scavuzzo, Root)
10. Engineering & Geotechnical Reports and Addenda
11. Review Correspondence
12. General Correspondence

ATTACHMENT A:

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 of 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.

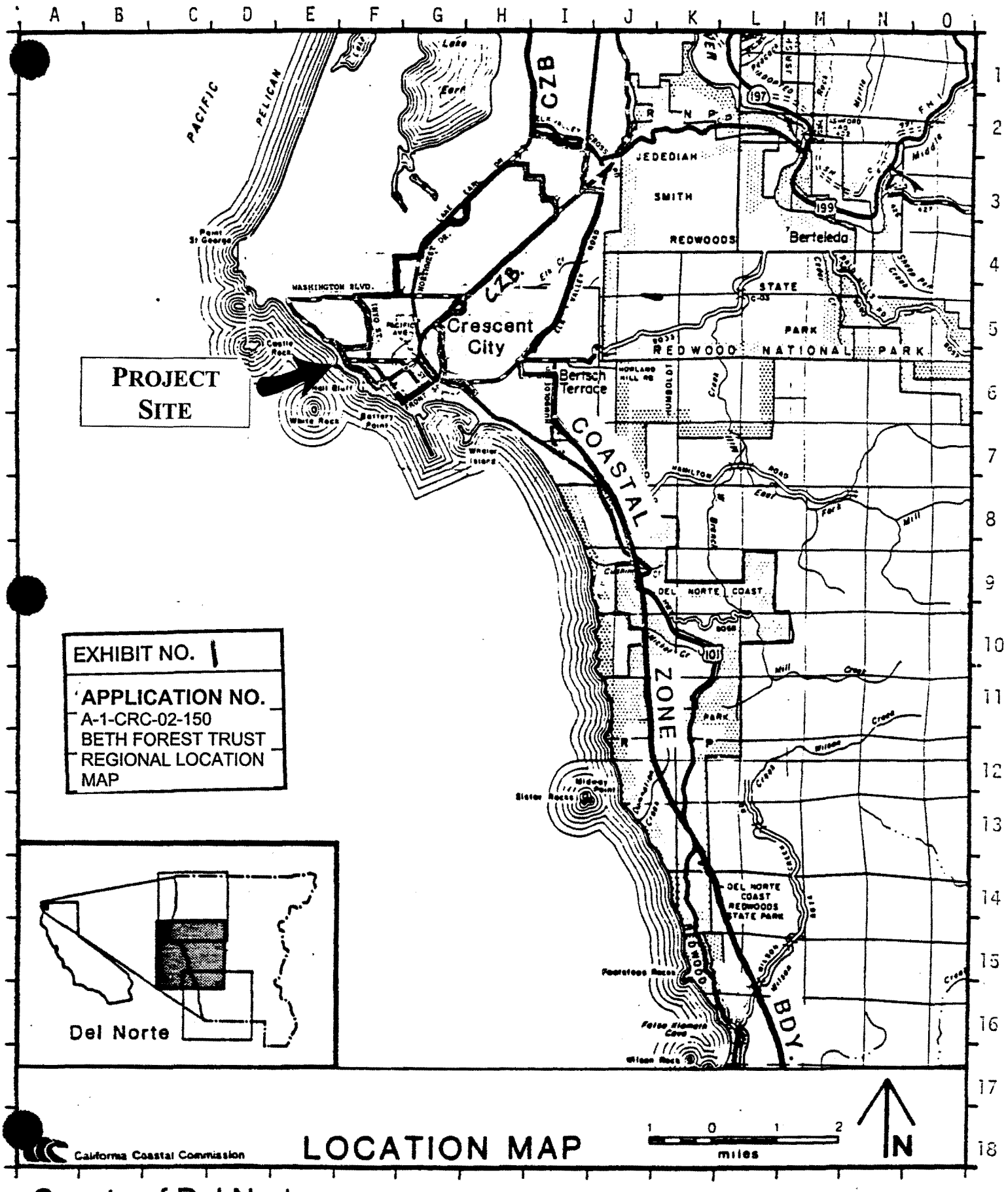
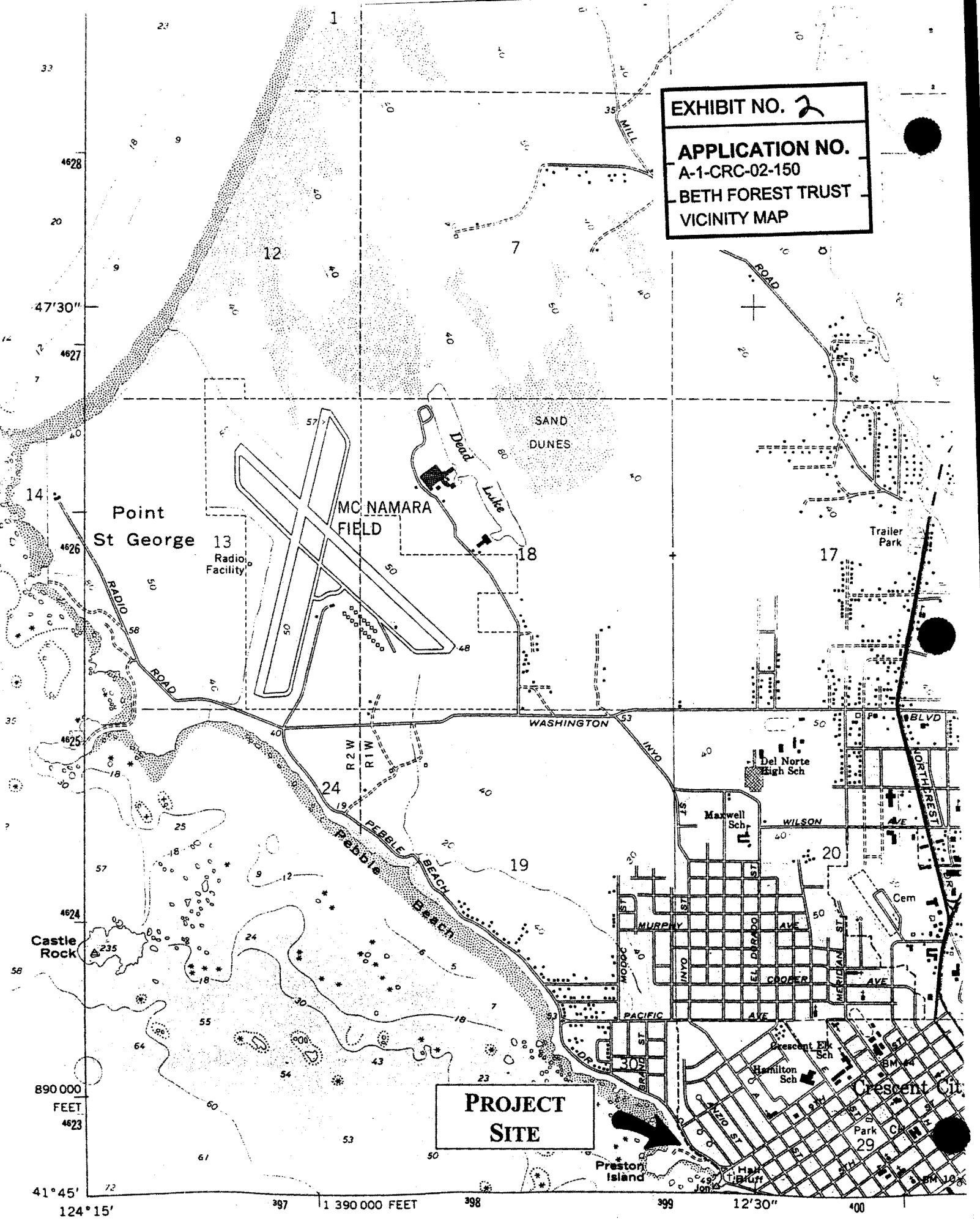


EXHIBIT NO. 1

APPLICATION NO.
A-1-CRC-02-150
BETH FOREST TRUST
REGIONAL LOCATION MAP

County of Del Norte

Sheet 2 of 3



Mapped, edited, and published by the Geological Survey

Control by USGS, USC&GS, and State of California

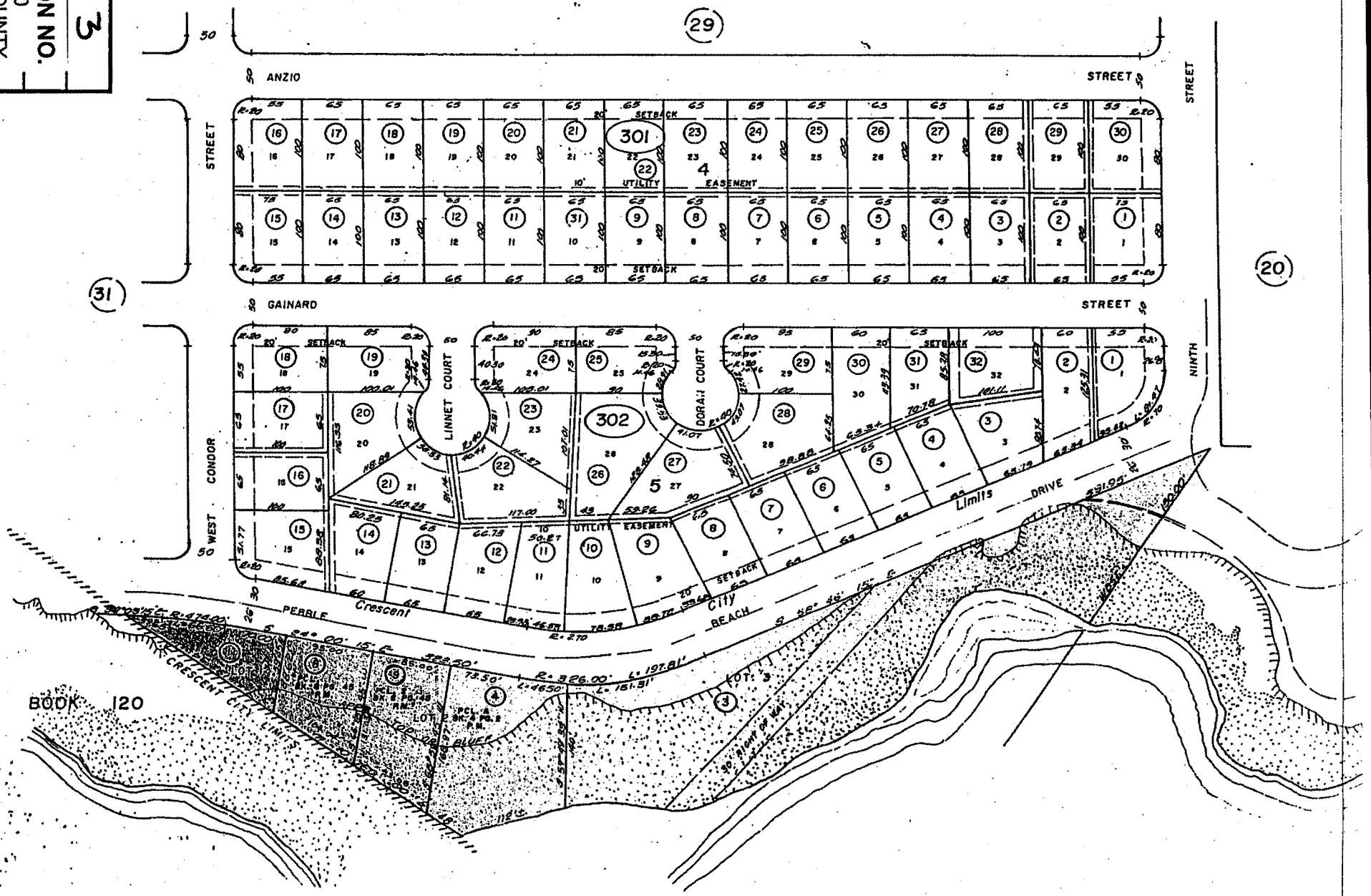
Topography by photogrammetric methods from aerial photographs

EXHIBIT NO. 3

APPLICATION NO.
1-CRC-02-150
DEL NORTE COUNTY
ASSESSORS PARCEL
MAP 118-30

BAUER REDWOOD MANOR UNIT 2
BK.4 PG. 28
LE MUNYON SUBDIVISION
BK.6 PG.63.

1" = 100'



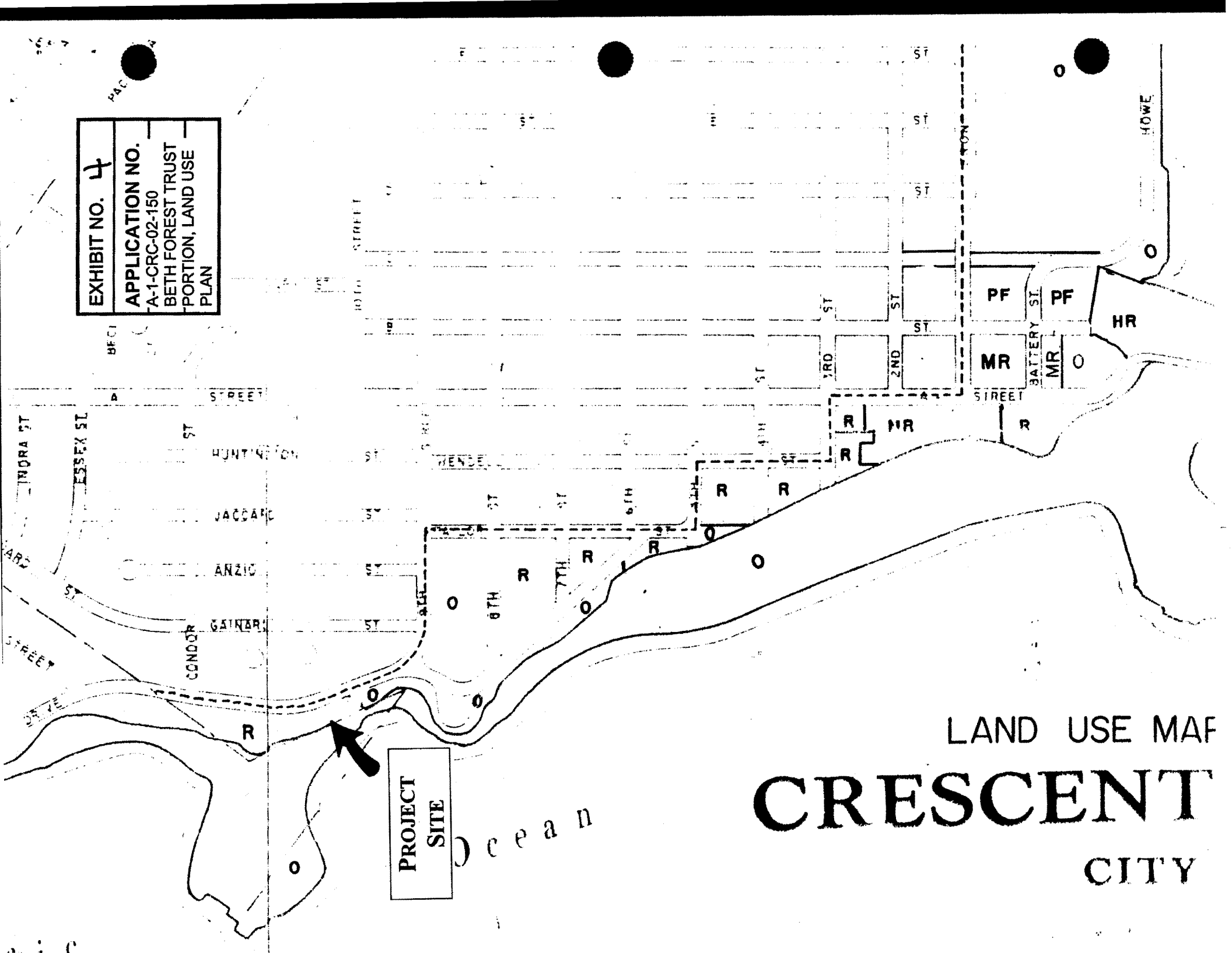


EXHIBIT NO. 4
APPLICATION NO.
A-1-CRC-02-150
BETH FOREST TRUST
PORTION, LAND USE
PLAN
PROJECT SITE
Ocean
LAND USE MAP
CRESCENT
CITY
PF
HR
MR
NR
R
O
HOWE
BATTERY ST
ESSEX ST
CONDOR
STREET
A STREET
HUNTINGTON
WENDLE
JACCARD
ANZIO
GAINARD
1ST
2ND
3RD
4TH
5TH
6TH
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8TH

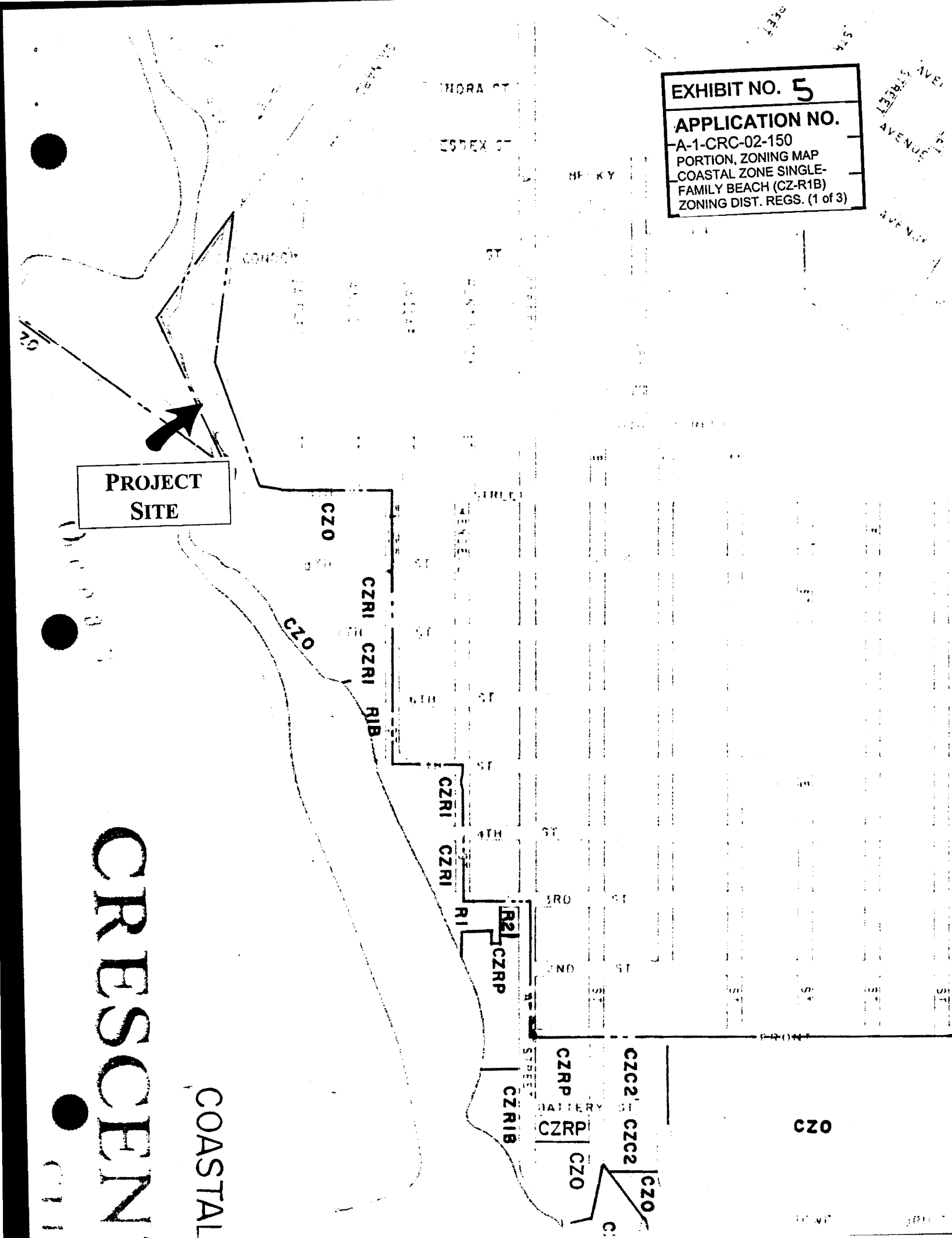


EXHIBIT NO. 5
APPLICATION NO.
A-1-CRC-02-150
PORTION, ZONING MAP
COASTAL ZONE SINGLE-
FAMILY BEACH (CZ-R1B)
ZONING DIST. REGS. (1 of 3)
PROJECT
SITE
CZO
CZRI
CZRI
R1B
CZRI
CZRI
R1
R2
CZRP
CZRP
CZRIB
CZRP
CZO
CZC2
CZC2
CZO
CZO
4TH
3RD
BATTERY
STREET
CRESCENT
COASTAL

to the rear of the main building, to the other side yard shall be maintained. This passage shall provide ready access around the main building. Further, construction on accessory buildings may only be started after the main building on the lot has been roofed and has the siding constructed.

D. Accessory buildings, structures, covered patios and garages shall not exceed thirteen feet in height at their highest point.

E. The main building may project into the required rear yard with the following restrictions:

1. The portion of the main building which projects into the required rear yard shall maintain the same side yard as required for the main building not in the required rear yard;

2. The main building shall not be located closer than ten feet to the rear property line; and

3. The area covered by the main building in the rear yard shall be counted as part of the permitted rear yard coverage.

F. On corner lots or reverse corner lots no accessory building, structure or covered patio shall be located closer to the street side property line than a distance equal to the required side yard on the street side.

G. On reverse corner lots accessory buildings, structures or covered patios located in the required rear yard within twenty-five feet of the street side property line shall be set back five feet from the rear property line.

H. Garages on interior lots may occupy side yards to a point not to exceed twenty-five feet from rear property lines. Garages on corner or reverse corner lots shall not be built closer than twenty feet to any street side property line. (Ord. 587 (part), 1983).

17.64.050 General provisions.

General provisions for the CZ-R1 district shall be as follows:

A. Parking. A minimum of two covered off-street spaces. See Chapter 17.76 for complete regulations and standards for required off-street parking.

B. Fencing. See Chapter 17.75 for complete fencing regulations.

C. Signs. Maximum sign of two square feet bearing only the name of occupant. Signs for the sale or lease of the property shall be limited to twelve square feet and illuminated only by reflected light and so erected that the light source is not visible from outside the premises. See Chapter 17.74 for signs permitted other than provided for in this chapter. (Ord. 587 (part), 1983).

Chapter 17.65

CZ-R1B COASTAL ZONE SINGLE-FAMILY BEACH DISTRICT

Sections:

17.65.010 Purpose.

The CZ-R1B district is a supplement to the single-family district for those areas which lie along a shoreline and consist exclusively of residential properties. The purpose of this chapter is to increase the restrictions placed on CZ-R1 property for the purpose of providing greater open space and visibility, while still permitting equal opportunities for developers of residential property similar to others within the community. (Ord. 587 (part), 1983).

17.65.020 Uses permitted.

Single-family dwellings and accessory buildings are the only uses permitted in the CZ-R1B district. (Ord. 587 (part), 1983).

17.65.030 Height and area regulations.

In the CZ-R1B district the height of buildings and the minimum dimensions of yards and lots shall be as follows:

A. Height. Maximum building height shall be twenty-five feet.

B. Areas and Yards.

1. Front Yard. Twenty feet;

2. Side Yard. Minimum ten feet for interior and corner lots. Reverse corner lots on the street side shall have a side yard equal to one-half of the required front yard of the lots abutting the rear of such reversed corner lots;

3. Rear Yard. Minimum twenty feet. Where back yards face upon the ocean side of the property no rear yard will be required;

4. Lot Area. A minimum of seventy-five feet of lot frontage is required and a minimum of six thousand square feet, unless the lot was previously legally subdivided;

5. Lot Area Per Dwelling Unit. Same as lot area;

6. Lot Coverage. Maximum for all buildings, accessory building structures and covered patios, not greater than fifty percent. (Ord. 587 (part), 1983).

17.65.040 Building placement.

All requirements of the CZ-R1 single-family district shall be required in the CZ-R1B district as it relates to building placement (see Section 17.64.040). (Ord. 587 (part), 1983).

17.65.050 General provisions.

General provisions for the CZ-R1B district shall be as follows:

A. Parking. A minimum of two covered off-street parking spaces. See Chapter 17.76 for complete regulations and standards for required off-street parking.

B. Fencing. No hedges, shrubs or fences between houses may exceed four feet in height in the side yard setback. Front yard fences may not exceed two and one-half feet in height.

C. Signs. Maximum sign of two square feet bearing only the name of the occupant. Signs for the sale or lease of the property shall be limited to twelve square feet and illuminated only by reflected light, and so erected that the light source is not visible from outside the premises. See Chapter 17.74 for signs permitted other than provided for in this chapter. (Ord. 587 (part), 1983).

Chapter 17.66

CZ-R2 COASTAL ZONE TWO-FAMILY DISTRICT

Sections:

17.66.010 Purpose.

A. The purpose of the CZ-R2 district is to provide living areas within the city where the density is of moderately low concentrations and where regulations are designed to be equal to those of a single-family district, except as to the concentrations of dwelling units and ancillary compatible uses.

B. The only permitted uses for any building or land, and any building to be erected or structurally altered in this district are described in Section 17.66.020, except where otherwise provided in these regulations. (Ord. 587 (part), 1983).

17.66.020 Uses permitted.

Uses permitted in the CZ-R2 district include:

A. One-family dwellings, occupied by not more than one family and not more than two boarders or roomers;

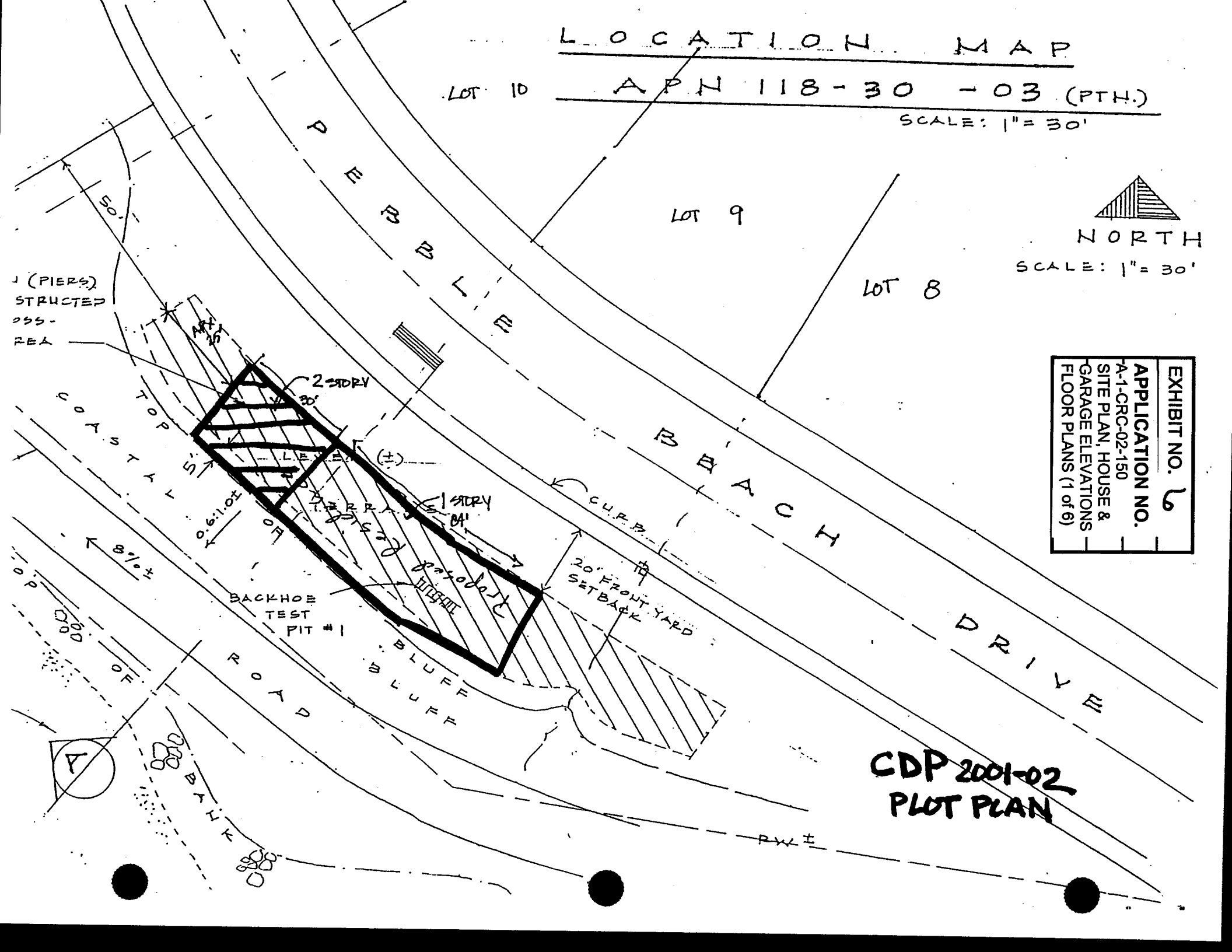
B. Two-family dwellings;

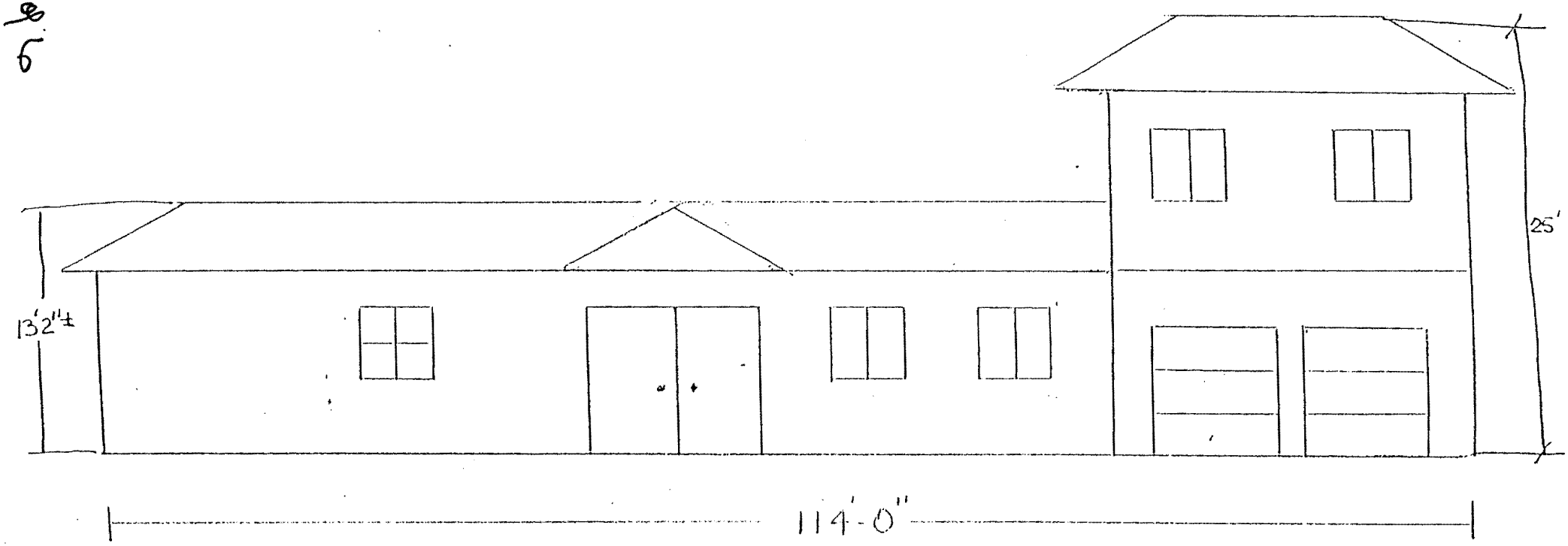
C. Foster homes limited to those licensed by the state or county, and accommodating not more than six guests;

D. Day nurseries accommodating not more than five children in number;

E. Accessory buildings;

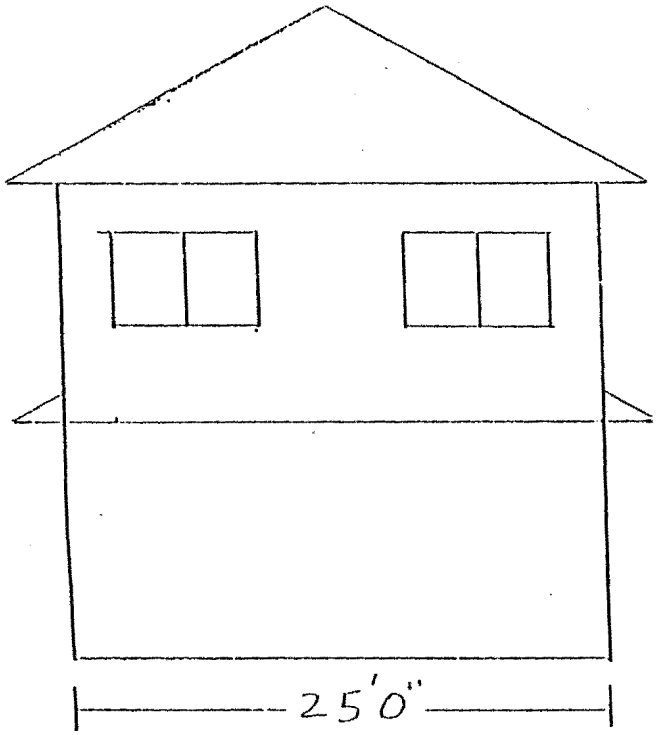
F. Any of the following uses, provided a use permit is secured:


LOCATION MAP
APN 118-30 -03 (PTH.)
SCALE: 1"= 30'
LOT 10
LOT 9
LOT 8
NORTH
SCALE: 1"= 30'
PEBBLE BEACH DRIVE
50'
(PIERS)
STRUCTED
OSS-
FEA
TOP
OF
BLUFF
2-STORY
30'
LEVEL
(±)
1 STORY
RESIDENCE
GARAGE
20' FRONT YARD
SETBACK
C.U.P.
BACKHOE
TEST
PIT #1
BLUFF
BLUFF
ROAD
BANK
8%±
0.6:1.0±
EXHIBIT NO. 6
APPLICATION NO.
A-1-CRC-02-150
SITE PLAN, HOUSE &
GARAGE ELEVATIONS
FLOOR PLANS (1 of 6)
CDP 2001-02
PLOT PLAN

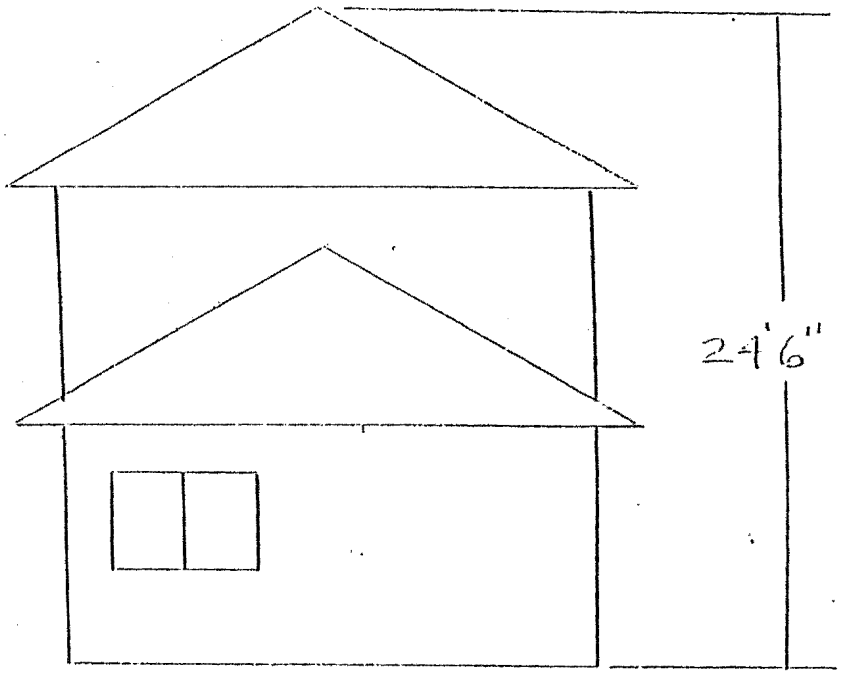


EAST ELEVATION

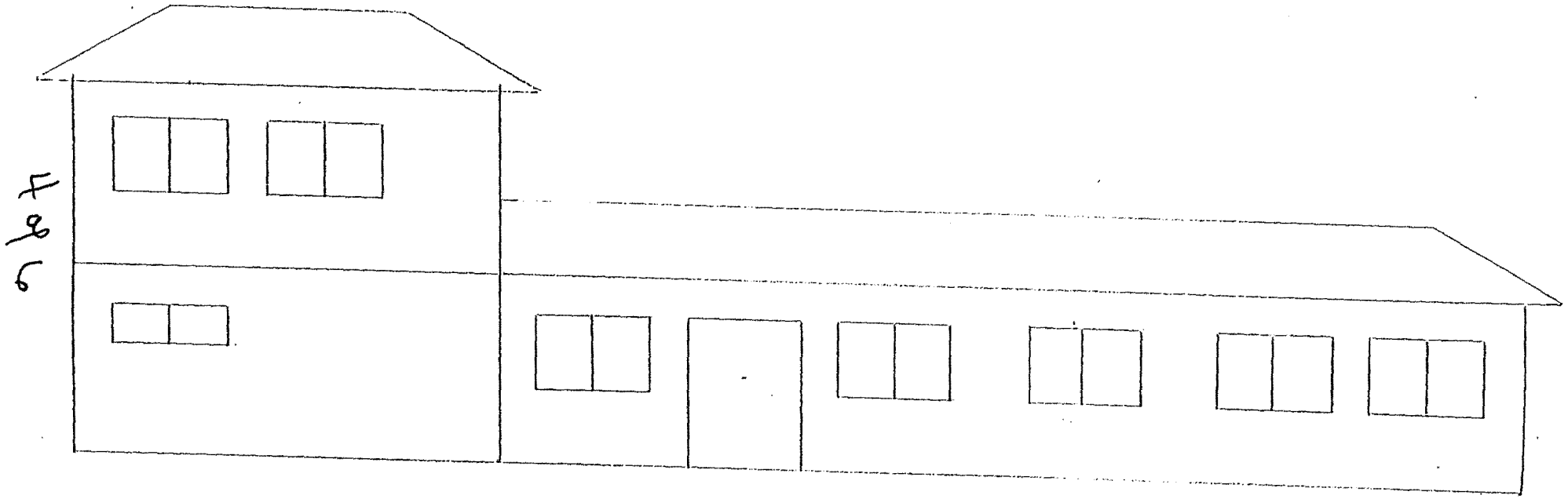
KRAFT



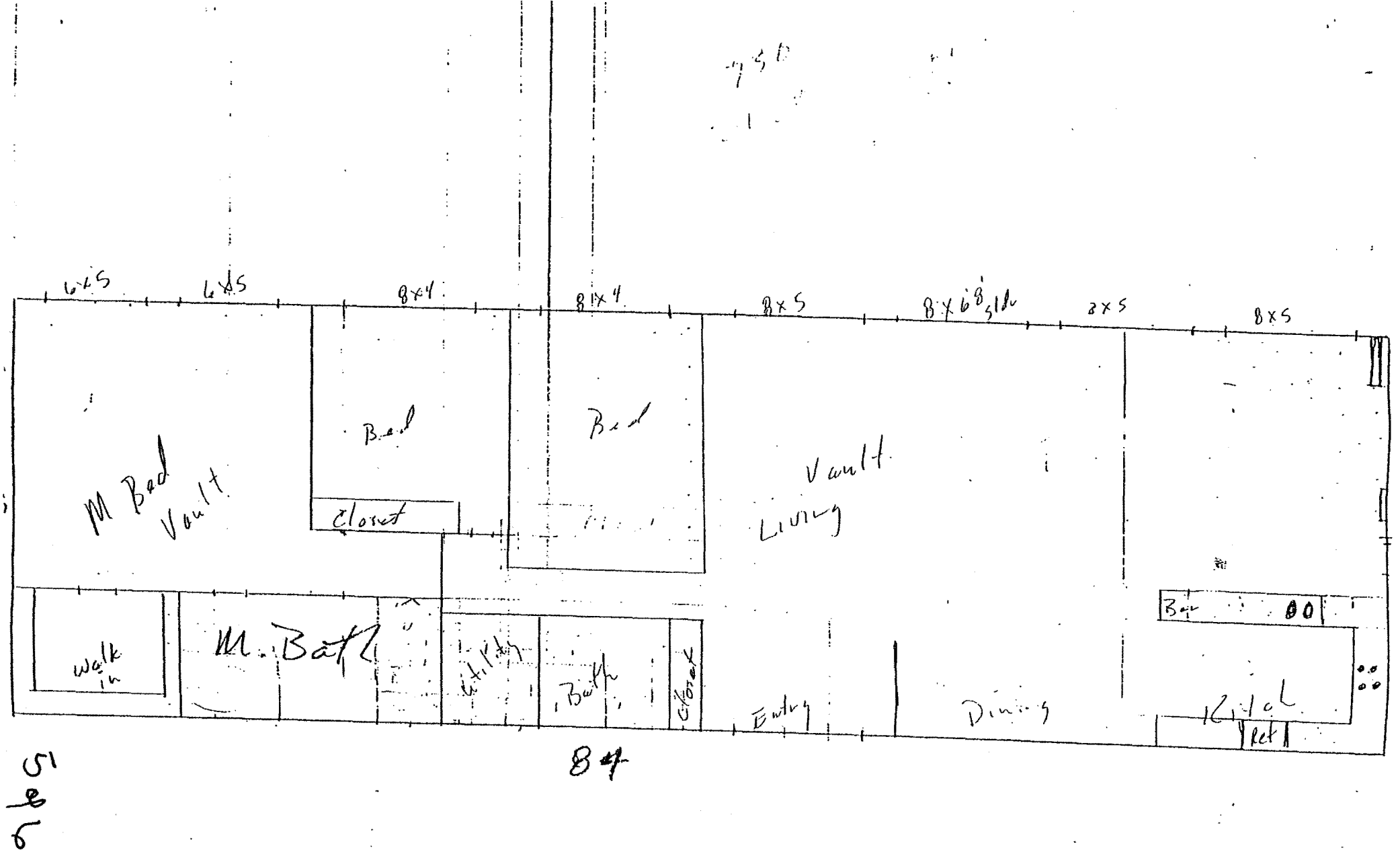
NORTH



SOUTH



WEST


6x5
6x5
8x4
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8x6 8 5/12
8x5
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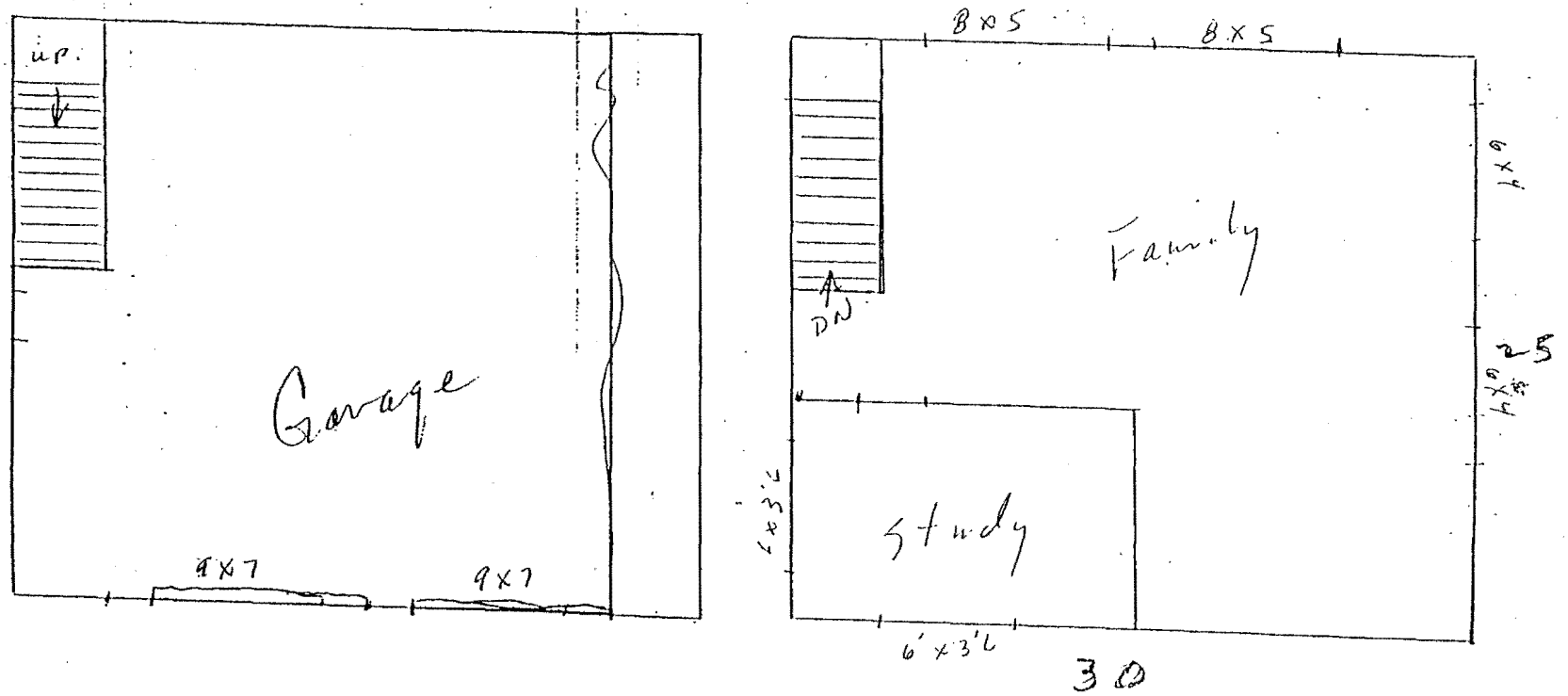
M Bed
Vault
Bed
Bed
closet
Vault
Living
walk in
M. Bath
Bath
Bath
Closet
Entry
Dining
Bar
Kitchen
Ref

84


up.
Garage
9x7
9x7
8x5
8x5
Family
DN
6x4
25
study
7'x3'6"
6'x3'6"
30

P O Box 35
Fort Dick, CA 95538
January 24, 2003

Mr. Bob Merrill
Mr. Jim Baskin
California Coastal Commission
P O Box 4908
Eureka, CA 95502-4908

RE: Appeal No. A-1-02 (Beth Forest Trust CDP)
Amended Project Description

Dear Messrs. Merrill and Baskin:

As you know, the Coastal Commission Permit application for the Beth Forest Trust project is pending before the Coastal Commission for *De Novo* review. As a result of the comments made by Coastal staff to the Coastal Commission regarding the foundation setback and the desire of the Commission to address the issue I, the agent for the Trust, have had the project engineer make the attached amendment increasing the setback of the pier and extension of the cantilever for your consideration. It is our feeling that of the possible alternatives, this is the most straightforward solution with the least impact upon other issues that have already been addressed. I also understand and have no objection to the submittal of the final construction plans showing the foundation to Coastal Staff for review for compliance prior to the City's issuance of the building permit.

If there are any questions or additional information please contact me at 707-464-4279. I will be unable to attend the Commission hearing regarding this item due to prior commitments. I feel that the Trust, its engineer and geologist, as well as the City, have done all that they can to make sure that the project complies with Coastal regulations and ask that the Commission take action to approve the amended project as soon as it can.

Thank you for your consideration,

Thomas J. Kraft, Trustee for Beth M. Forest Trust

EXHIBIT NO. 8
APPLICATION NO.
A-1-CRC-02-150
BETH FOREST TRUST
NOTICE OF FINAL
LOCAL ACTION (1 of 5)

CITY OF CRESCENT CITY

NOTICE OF FINAL ACTION
COASTAL DEVELOPMENT PERMIT

Date: October 7, 2002

The following project is located within the Crescent City Coastal Zone. A coastal development permit for this project has been acted upon.

Applicant: Beth M. Forest Trust Agent: Tom Kraft

Application File No.: CDP 2001-02 Filing Date:

Project Description: Construction of single family residence

Location: 1100 S Pebble Beach Dr. **APN:** 118-300-03

Action Date: October 7, 2002 **By:** City Council

Action: ____Approved ____Denied ____Approved With Conditions _X_ Denied Appeal and Upheld Action of Planning Commission on August 8, 2002

Findings:
A. The project is located upon a privately owned legally created parcel and consists of a one-family residence which is a permitted use and consist with the City Local Coastal Plan land use and R1-CZ zoning designations;

B. The project is located between the first road and the sea and is a part of the LeMunyon subdivision under which public access across this property, from Pebble Beach Drive to the Preston Island public beach area, has been dedicated, is improved and is utilized.

C. A Soils & Foundation Investigation by Lee Tromble Engineering dated August 22, 2001 and a Geotechincal Report for the Kraft Property by Bush Geotechincal Consultants dated December 20, 2001 have identified risk issues and demonstrated the means to construct a residence on the property, subject to specific recommendations which address these risks, including the property owner's acceptance of the risks and responsibility for control of vegetation removal and runoff. These recommendations have been incorporated into the project design and the conditions of the project permit.

D. The project is to be constructed at natural grade and no significant alteration of natural landform nor shoreline protection device is a part or anticipated to be a part of the project.

E. The Pebble Beach Drive area in which the project is located is not designated as highly scenic area by the existing certified Crescent City Local Coastal Plan or by the California Coastal Preservation and Recreation Plan.

F. The Crescent City scenic drive route in the project area was independently adopted by the City Council for the purpose of guiding the visitors to public vista and access points in the Crescent City area and does not include any adopted or inferred conditions, restrictions or limitations upon the use of adjacent private properties.

G. As a mixed one and two story design the project is reflective of and compatible with the adjacent Coastal and non-Coastal urban residential neighborhood which consists primarily of two story residences.

H. Although any project on the property would result in the loss of some views from private residences the project minimized impacts on primary views from existing residences across the street and retains over 85% of its frontage in open area providing continued public views of the ocean from Pebble Beach Drive and the nearby Brother Jonathan public vista point.

I. The Busch Geotechnical report prepared for the project indicates that the potential for indirect physical changes at the site which exist are mitigated by the project and project conditions as addressed in the Mitigation Plan.

J. Based upon project information and public comment an Initial Study with Mitigation Plan was prepared and a Mitigated Negative Declaration posted, circulated (SCH# 2002032070) with no additional comment and is hereby adopted.

K. As conditioned, the project does not have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

L. As conditioned, the proposed project does not have the potential to achieve short-term, to the disadvantage of long-term, environmental goals.

M. The proposed project does not have impacts that are individually limited, but cumulatively considerable.

N. An appeal of the Planning Commission action approving the project was filed with the City Council which was considered by them at a public hearing on June 17, 2002 and was remanded by them to the Commission for review and consideration as to whether there is substantial evidence, as defined by CEQA, and which would result in a need for substantial revision of the Mitigated Negative Declaration regarding the appeal issue of the project site and blasting during the quarrying of nearby Preston Island.

O. The Planning Commission held a public hearing on August 8, 2002, to consider whether there is substantial factual evidence demonstrating that blasting during the quarrying of Preston Island would have fractured underlying bedrock at the project site in a manner not previously addressed by the project Mitigated Negative Declaration (SCH#200203070) and which would identify a new significant effect requiring amendment of the project and/or new mitigation measures which would warrant additional circulation and review of the Mitigated Negative Declaration documents.

P. Upon review of the evidence submitted at its hearing, including an additional report of Busch Geotechnical Consultants dated 29 July 2002, the Commission has determined that no substantial factual evidence has been provided indicating that the quarrying at Preston Island resulted in any geologic factors which have not already been addressed by its previous review and actions. No revision or additional review of the Mitigated Negative Declaration is warranted.

Q. An appeal of the Planning Commission action of August 8, 2002 was filed with the City Council which was considered by them at a public hearing on October 7, 2002 at which time the Council took action denying the appeal and upholding the August 8 action of the Planning Commission for the following reasons:

a) The action of the Commission on August 8 was to amend the findings of the Commission Resolution which had already approved the Coastal Development Permit - no new action was taken regarding approval of the permit other than addition of findings.
b) The current appeal of Scavuzzo et al does not address the evidence, discussion or actions regarding the issue of the August 8 Commission hearing, that is Appeal Issue B: the impacts of blasting at Preston Island and whether additional environmental review based upon that issue was warranted.
c) The published deadline for appealing any issue related to the decision of the Planning Commission regarding the environmental document and its contents, or the coastal permit and its conditions, was May 20, 2002. Since the subject appeal outlines issues other than the original issues appealed it has been filed three months too late.
d) The appeal is based upon data not provided to the Planning Commission. It is noted that the appealant was given the opportunity to inform the City if a geological report addressing the original appeal issue was to be submitted so that sufficient time for the Commission hearing could be made.
e) The grounds for appeal are based upon erroneous and misleading references to the Galli Group report in that it indicates that the three issues cited are "conclusions" of that report. The issue topics are clearly stated on pages one and two of the report as "Development Considerations", a section of the report which is separate from the "Conclusions" section on page 2.
f) The applicant did provide the Planning Commission additional technical data by Busch Geotechincal Consultants addressing the identified appeal issue of blasting which indicated no new significant issue and which the Commission did consider in its review of the appeal.

Conditions of Approval:

1. The corners of the Designated Disturbance Area shall be established by a survey conducted by a person licensed to survey in California, and the building corners and points of articulation, as shown on the approved plot plan, shall be marked in the field prior to issuance of the building permit and any ground disturbance.

2. Final construction plans shall locate the foundation structure within the Designated Disturbance Area, to the design specifications of the project geotechnical report of Busch Geotechnical Consultants dated December 20, 2001, and any cantilever of the structure shall not extend beyond the edge of the top of bluff. If necessary, the building floorplan shall be reduced to meet this requirement.

3. The project shall not exceed overall building dimensions as approved. Any changes increasing these dimensions, changing excavations or foundation design, changes or increasing structure height shall require a new permit review.

4. There shall be no placement of construction materials or equipment, or disturbance of the ground, or disturbance or removal of vegetation, at or below top of bluff or outside designated disturbance area at any time. The limbing and/or topping of trees adjacent to the structure for safety purposes shall be permitted.

5. All final design, construction and occupancy of the project shall comply with all recommendations of the Soils & Foundation Investigation by Lee Tromble Engineering dated August 22, 2001 and all of the recommendations of the Bush Geotechincal Consultants Geotechincal Report for the Kraft property dated December 20, 2001. In such instance as a conflict between the two reports regarding a specific issue, the Busch report shall be utilized.

6. Construction activities which involve soil disturbance or placement of structures in the soil (eg foundation, driveways, etc) shall be limited to the time period between May 1st and November 1st. All exposed soils which have been disturbed shall either be 1) seeded and/or landscaped and mulched by October 1, or 2) have hard surface materials (ie concrete) placed by November 1, of the year in which the soil disturbance occurs. Where on-site drainage is established appropriate best-practice erosion constrol measures shall be utilized, subject to the approval of the Project Engineer and acceptance by the City Engineer during building permit review. All disturbed surfaces shall be finished in a manner to drain towards Pebble Beach Drive. All construction site drainage shall drain towards Pebble Beach Drive. All finished surfaces shall drain towards Pebble Beach Drive.

7. By construction of the project the applicant agrees, on behalf of themselves and all successors and assigns, that no bluff or shoreline protective device(s) shall ever be constructed to protect the development approved pursuant to this permit, including, but not limited to, the structure, foundations, decks, pathways, driveway, drainage facilities or an other future improvements in the event that the development is threatened with damage or destruction from waves, erosion, storm conditions, bluff retreat, landslides or other natural hazards in the future.

8. Landscaping may be placed within the Designated Disturbance Area and within that portion of front yard setback between the designated disturbance area and the City sidewalk. The construction of fences or placement of hedges shall comply with the requirements of the applicable zoning code.

9. By construction of the project the applicant and any successors and assigns or other holder of possessory interest in the development authorized by this permit acknowledge and agree: 1) that the site may be subject to hazards from waves, storm waves, flooding and erosion; 2) 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; 3) to unconditionally waive any claim of damage or liability against the City, its officers, agents, and employees for injury or damage from such hazards; 4) to indemnify and hold harmless the City, its officers, agents and employees with respect to the City'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; and 5) to agree to include a provision in any subsequent sublease, assignment or transfer of the development authorized by this permit to another party giving constructive notice of the conditions of this permit.

10. During construction signs shall be placed along the Preston Island access driveway identifying: "construction zone" and "caution".

11. A 5 ft residential sidewalk shall be constructed as part of the project along the Pebble Beach Drive frontage per the requirements of City Code

12. A building permit, including sewer and water hook-ups and road encroachment permits, shall be issued prior to any ground disturbance.

____ Not Appealable to the Coastal Commission.

__X__ Appealable to the Coastal Commission pursuant to Public Resources Code, Section 30603. An aggrieved person may appeal this decision to the Coastal Commission within ten working days following Commission receipt of this notice. Appeals must be in writing to the appropriate Coastal Commission District Office.

By:
City of Crescent City
Planning Department
377 "J" Street
Crescent City, CA 95531
(707)464-9506

For Use: All CDP's

CALIFORNIA COASTAL COMMISSION
NORTH COAST DISTRICT OFFICE
710 E STREET • SUITE 200
EUREKA, CA 95501-1865
VOICE (707) 445-7833
FACSIMILE (707) 445-7877

MAILING ADDRESS:
P. O. BOX 4908
EUREKA, CA 95502-4908

RECEIVED
OCT 25 2002
CALIFORNIA
COASTAL COMMISSION

APPEAL FROM COASTAL PERMIT DECISION OF LOCAL GOVERNMENT

Please Review Attached Appeal Information Sheet Prior To Completing This Form.

SECTION I. Appellant(s)

Name, mailing address and telephone number of appellant(s):

Louise Campbell (LOUISE CAMPBELL) 1015 PEBBLE BEACH DR., CRESCENT CITY, CA 95531 (707) 465-6457
Arthur B. Lewis (ARTHUR LEWIS) 1015 PEBBLE BEACH DR., CRESCENT CITY, CA 95531, 707-465-6457
Michael Scavuzzo 1127 Pebble Beach Drive Crescent City, CA 707/464-4866
Zip Area Code Phone No.
Marvin & Carol Root 1180 Pebble Beach Drive Crescent City, CA 707/464-1528
(SEE ATTACHED LIST)

SECTION II. Decision Being Appealed

1. Name of local/port government: City of Crescent City, CA 95531

2. Brief description of development being appealed: Proposed residence along coastal bluff along Pebble Beach Dirve. (25' high x 114' in length)

3. Development's location (street address, assessor's parcel no., cross-street, etc.): 1100 Pebble Beach Drive, AP# 118-300-03

4. Description of decision being appealed

a. Approval; no special conditions: x

b. Approval with special conditions: _____

c. Denial: _____

Note: For jurisdiction with a total LCP, denial decisions by a local government cannot be appealed unless the development is a major energy or public works project. Denial decisions by port governments are not appealable.

TO BE COMPLETED BY COMMISSION:

APPEAL NO: A-1-CRC-02-150

DATE FILED: 10/25/02

DISTRICT: North Coast

EXHIBIT NO. 9

APPLICATION NO.
A-1-CRC-02-150
APPEAL, FILED 10/25/02
(CAMPBELL, LEWIS SCAVUZZO, ROOT) (1 of 22)

5. Decision being appealed was made by (check one):

a. ___ Planning director/Zoning Administrator

c. ___ Planning Commission

b. _x_ City Council/Board of Supervisors

d. ___ Other_____

6. Date of local government's decision: October 7, 2002

7. Local government's file number (if any): CDP 01-02

SECTION III. Identification of Other Interested Persons

Give the names and addresses of the following parties. (Use additional paper as necessary.)

a. Name and mailing address of permit applicant:

Tom Kraft
155 Tamarak Drive
Crescent City, CA 95531

b. Names and mailing addresses as available of those who testified (either verbally or in writing) at the city/county/port hearing(s). Include other parties which you know to be interested and should receive notice of this appeal.

(1) Michael Scavuzzo
1127 Pebble Beach Drive
Crescent City, CA 95531

(2) Jack Nicholson
955 S. Pebble Beach Drive
Crescent City, CA 95531

(3) Mary Varna
1075 S. Pebble Beach Drive
Crescent City, CA 95531

(4) Larry & Lorna Amos
1151 Pebble Beach Drive
Crescent City, CA 95531

(5) Jeannie Cresci
1505 Margie St.
Crescent City, CA 95531

(6) Mike Saben
P.O. Box 1677
Crescent City, CA 95531

SECTION IV. Reasons Supporting This Appeal

Note: Appeals of local government coastal permit decisions are limited by a variety of factors and requirements of the Coastal Act. Please review the appeal information sheet for assistance in competing this section, which continues on the next page.

APPEAL FROM COASTAL [illegible]T DECISION OF LOCAL GOVERNMENT (Page 3)

State briefly your reasons for this appeal. Include a summary description of Local Coastal Program, Land Use Plan, or Port Master Plan policies and requirements in which you believe the project is inconsistent and the reasons the decision warrants a new hearing. (Use additional paper as necessary.)

Refer to Attached Narrative

Note: The above description need not be a complete or exhaustive statement of your reasons of appeal; however, there must be sufficient discussion for staff to determine that the appeal is allowed by law. The appellant, subsequent to filing the appeal, may submit additional information to the staff and/or Commission to support the appeal request.

SECTION V. Certification

The information and facts stated above are correct to the best of my/or knowledge.

Michael Scanlon
Signature of Appellant(s) or Authorized Agent

Date 10/22/02

Note: If signed by agent, appellant(s) must also sign below.

SECTION VI. Agent Authorization

I/We hereby authorize _____ to act as my/out representative and to bind me/us in all matters concerning this appeal.

_____
Signature of Appellant(s)

Date _____

3 of 22

Reasons for this Appeal:

The appeal to the decision to grant a Coastal Development Permit for the proposed residence at 1100 South Pebble Beach Drive is based on the inconclusive nature of the primary submittals as contained in the Busch geologic report regarding the potential for shoreline erosion and geologic instability at this location. The project as proposed contains only sketch plans for a proposed residence, while the geologic information of the project proponent does not consider the long term viability of the site as it relates to site stability, the former quarry activity in and around the site, underground drainage/aquifers, and the high probability of seismic activity causing site damage. These issues need to be addressed as outlined in the provisions of the City's adopted Local Coastal Plan.

This site is particularly subject to heavy seasonal inundation, which will cause eventual shoreline erosion to occur and could lead to the need for shoreline protective measures, such as a retaining wall, which is principally not permitted in the City's Local Coastal Plan as adopted. Property owner R. Perry Taylor, whose home is located north of the proposed site experienced substantial bluff slumping and collapse during construction of his residence, using a similar grade and beam system to the one proposed by Mr. Tromble, the local design engineer. Due to subsurface springs/ underground aquifers that exist at a 35 foot depth, and winter rainfall, a collapse of the bluff occurred within 2-3 years of building, necessitating construction of a retaining wall below the bluff. This was needed to provide permeable drainage for the groundwater. As a result of construction, bluff erosion can also occur causing damage to the road below, thereby impacting coastal access. To date, this issue has not been adequately addressed. (Refer to attached letter from Mr. R. Taylor, dated October 8, 2001.)

The Crescent City L.C.P. amendment NO. CRC-MAJ-1-00 states the following:

"In the absence of conclusive information on which to accurately base long- range bluff and beach retreat rates, prudent measures are necessary in order to ensure that an adequate setback is provided for all shoreline development. Geotechnical assessment for projects along the City's oceanfront shall specifically take into account that long range bluff and beach retreat rates are based on inconclusive and sparse data. As warranted, the reports shall also identify other measures to ensure the long-term stability and structural integrity, and neither shall contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area, or in any way require the construction of protective devices." This issue is restated as Policy #7 of the LUP Chapter 5, "Diking, Dredging, Filling, and Shoreline Structures" of the Crescent City Land Use Plan.

It states "Prior to issuance of a coastal development permit for the development, a deed restriction acceptable to the Planning Director shall be recorded memorializing the prohibition on future shoreline protective structures." Therefore, the project's geological information presented does not adequately address the sites' long term soil and bluff stability issues and the proposed project is inconsistent with the City of Crescent City's adopted Local Coastal Plan with regard to Policy #7.

The high potential for an El Nino or La Nina weather pattern can lead to significant saturation of soils, with the Galli Geotechnical Report projecting some 15 -20 feet of bluff retreat and erosion resulting over time. The preliminary information as presented in the Busch Geotechnical study does not fully consider these variables, particularly the long term effects of high levels of inundation, potential for bluff retreat, erosion and underground drainage problems, in addition to other potential site impacts as a result of construction in an area of high geologic risk.

While construction is required to adhere to seismic building codes, this in itself cannot ensure that damage to the property and surrounding area can be avoided. The narrow and steep nature of this particular location along with the aforementioned potential for bluff retreat, existing underground springs, as well as historical quarrying use of the immediate area should mandate further geological and biological analysis as well as site investigations in order to ensure the public safety. The environmental analysis and project information offered does not fully address the risk factors associated with development of this site.

There will be a loss of scenic views if the proposed project is allowed to proceed. While Pebble Beach Drive is not formally identified as a State designated Scenic Route, it is considered by the majority of residents of Crescent City and visitors to the area as a locally identified scenic road offering spectacular coastal access and views and is signed as such. (Refer to attached photograph). The site in question (1100 Pebble Beach Drive) is frequented by hikers and naturalists who appreciate its scenic vantage point of the coast. Development of the site will impact public views along this section of the roadway.

In conclusion, it appears that several significant coastal development issues have been identified that remain unresolved with regard to the proposed development of 1100 Pebble Beach Drive that warrant a review of applicable local Coastal Plan requirements.

R. Perry Taylor, Ph.D.
1262 S. Pebble Beach Drive
Crescent City, CA 95531-3559
Tel. 707-464—3586 – Fax. 707-465-1286
E-mail – perry@hctvalk.com

October 8, 2001

Fax to 707-465-4405
City of Crescent City
Planning Commission
377 J Street
Crescent City CA 95531

Dear Sirs:

Project CDP 01-02 – Tom Kraft

I live at 1262 S. Pebble Beach Dr., on the ocean side, three houses north of the proposed construction. As a fellow resident of the cliff edge, I welcome Mr. Kraft, but I would like to make the following comments from my own experience. Please make these available to the Commission members, and to the public attending the meeting.

Our house was built 20 feet from the bluff edge in 1992-3 using a pier and grade beam system, similar to that proposed by Mr. Tromble in the present application. During drilling of the piers and construction, a substantial part of the bluff slumped and collapsed. The bluff appeared to have been stable for a long time before construction.

Apparently, the soft sediments overlaying the impermeable base rock were penetrated by surface drainage from rains, aided by the disturbance of drilling for the piers. The heavy water flow at the interface of the impermeable rock and the overlaying sediments, at about 35' depth, produced "springs" along the cliff face and undermining the overburden. This resulted in substantial slumping and collapse of the bluff edge near the house. Additionally, there was a larger area of lesser slumping over the entire construction area.

During the next 2-3 years, more slumping occurred, especially during winter rains, and it proved necessary to build a 10 foot high retaining wall below the bluff, close to the beach to minimize slumping. The retaining wall was backfilled with hundreds of tons of rock, to replace the collapsed bluff, provide massive support and permeable drainage for groundwater. This wall and fill was very expensive, costing well over $25,000, and was not anticipated at the time of construction.

It should be noted that Del Norte County spent well over $1,000,000 on rock fill further north at several points along Pebble Beach Drive. This bluff collapse was not from marine erosion, but from underground waters emerging from the cliff, well above the high tide line, at the top of the impermeable layer and undermining the overburden. These "springs" can be seen at many places above the beach along Pebble Beach Drive, including below my property and at the beach road below the subject property. Evidence

of slumping of the bluff edge additionally can be seen both north and south of the subject property. In fact much of the Brother Jonathan Point overlook has collapsed during the last few years, resulting in relocation and repaving of the parking area. None of these areas have been impacted by ocean erosion, but appear to be undercutting by groundwater.

Building a residence on this narrow strip of land above the bluff, with ground disrupting piers drilled only 5' from the edge, seems to invite many problems. Bluff collapse will impact the road below. There is potential liability of injury to pedestrians on the beach road during construction and after. Natural processes, aided by future surface lawn watering and irrigation, will eventually cause the bluff edge to migrate under the house, leaving the latter sitting up on stilts. The net result, long term, will be to end up with a house on stilts, requiring an ugly retaining wall where the bluff was, and the loss of a pleasant grassy vista at the curve of Pebble Beach Drive.

Additionally, I would not like to see any future application for reduction of front yard setbacks, to move this house further from the bluff edge. This property is viewable from a good length of Pebble Beach Drive, approaching from the north, and it would be desirable to encourage enough open space for attractive landscaping.

I hope these comments, intended constructively, will prove useful. Unfortunately, I am out of town, and cannot attend the public meeting in person. I can, however, be reached at 619-423-6895, or Email at perry@bctwalk.com.

Sincerely,

R. Perry Taylor

Copy

Marvin & Carol Root
1180 S. Pebble Beach Drive
Crescent City CA 95531
Tel. 707-464-1528

February 13, 2002

City of Crescent City
Planning Commission
377 J Street
Crescent City CA 95531

Dear Sirs:

Project CDP 01-02

We reside at 1180 S. Pebble Beach Drive, directly north and adjacent to the proposed building site. We would like to take this opportunity to address our concerns regarding this project.

Six years ago we were forced to replace half of our concrete driveway, due to slippage, and are now faced with the possibility of having to do the same with the remaining portion as slumping has continued. This job does not come cheap as the old cement must be broken up and hauled away. Regrading is labor intensive and installing new rebar and pouring cement is also quite expensive. Geology reports are evidently no guarantee of permanent soil/land stability.

The proposed site is located directly above the coastal access road down to Preston Isle. Year round there are always people walking and cars driving up and down this road. If in the event of a massive slide from this property onto this road who is liable for any injuries and/or property damage done? The City? The County? The property owner? In any event, would not we, the taxpayers, be the ultimate payers? In 1998 the City of San Anselmo CA was found liable for mud slides onto private property, and they are appealing to the Supreme Court.

The issue of wildlife comes to mind as well. This site has long been a haven to a multitude of flora and fauna (including owls, snakes, raccoons.etc.) Cutting the few remaining trees would certainly remove these species from the area. As we all know, they contribute a great deal in balancing the ecosystem.

Tourism might also be affected as this has been considered a "beautification" site. People often park their cars and walk this lot for viewing and photo opportunities.

Sincerely,

Marvin & Carol Root

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Mike - Just for your info.
Probably not concerning our project. But who knows.

1-25-02 - TRIPLICATE

Town wants out of mudslide liability

SAN ANSELMO, Calif. — San Anselmo is asking the state Supreme Court to absolve the town of liability for damages caused by a mudslide on private property four years ago.

The 1998 slide swept a mountain of mud and hundreds of trees from one piece of private property to another. Both owners sued the town for the cost of repairs because water draining from a public street caused the slide.

– *By The Associated Press*

THE GALLI GROUP
Geotechnical Consulting

02-2574-01
August 16, 2002

Mr. Mike Scavuzzo
1127 S. Pebble Beach Drive
Crescent City, California 95531

Subject: **GEOTECHNICAL CONSIDERATIONS**
PROPOSED LOT DEVELOPMENT
1100 PEBBLE BEACH DRIVE
CRESCENT CITY, CALIFORNIA

Mr. Scavuzzo:

In accordance with your authorization, we have accomplished a limited evaluation of the lot located at 1100 Pebble Beach Drive. Our evaluation included a review of several previous reports by others, a review of our previous work in the area, a site visit and consideration of static and dynamic loads anticipated on this developed lot.

SITE DESCRIPTION

The subject parcel is a narrow lot located between Pebble Beach Drive and the Pacific ocean seacliff. The seacliff (some of which has been excavated in the past for an access roadway) falls away from the lot at slopes between 0.3H:1.0V to 1.5H:1.0V. Some areas of the slope down to the access road (which runs across the toe of the slope) appear to be almost vertical in some locations.

Vegetation varies from coastal grasses, understory brush and scattered evergreen trees. Surface soils appear to be clayey sands with soils becoming sandier with depth. Some cementation can be expected in various locations of these terrace deposits. Underlying the surface soils and terrace sands is a fractured bedrock of various origin. Depth to the weathered fractured rock varies from 4 or 5 feet to at least 15 feet. Soil exposures on the seacliff face indicate that soil depths near the steep slope could be greater than 15 feet.

DEVELOPMENT CONSIDERATIONS

Global Stability. Based on our review of the reports by others, we are in general agreement with the statements regarding a low risk of damage due to global or large-scale slopes failures. However, we were unable to find any indication that the orientation, frequency and severity of rock fractures or bedding planes were considered in large-scale stability during a moderately large seismic event. Adverse bedding planes which dip out of the cut slope or natural sea cliff or other discontinuities in the rock mass that cause

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weak planes, can create an unstable situation during a seismic event. Unless data is available on the fracturing and bedding, it would be prudent to obtain and evaluate such data. The presence of adverse bedding planes or severe fracture patterns may require rock bolting or other method of preventing large-scale instability of the parcel during a moderately large seismic event.

SeaCliff Degradation. This area of California is subject to severe rainstorms during the winter months. Soils along the seacliff can become fully saturated during this wet period of the year. Saturated soils, including partially cemented terrace deposits, have reduced strength characteristics. As can be seen on numerous locations along the seacliff, small and large scale sloughing of the soils above the rock occurs throughout the northern California coast. The oversteepened seacliff soil slopes can be expected to slough away as the areas observable on adjacent lots. These soils will tend to fail back to slopes of between 1.3H and 1.5H:1.0V.

While the cemented terrace deposits observed on other lots north of this area exhibit vertical cracking and "block" failures. These less cemented soils will most likely weather away in smaller portions, creating a more gradual and more stable slope. This could result in slope degradation of from 10 to 15 feet back from the current location.

Seismic Loading. The subject parcel is likely to be subjected to severe ground shaking during the life of the proposed development (single-family residence). Based on reports by others and our work on other sites in the area, the anticipated peak horizontal ground acceleration for this parcel could be on the order of 0.4 to 0.5g. This magnitude of lateral acceleration, especially when shaking occurs over a significant period of time. Such lateral "loading" of the seacliff area can cause soil and rock failure to occur. If such shaking takes place in the wet winter months, the soil movements could be large. Adverse bedding planes or other rock discontinuities can also allow larger scale failure to take place on this parcel.

It is likely that large soil movement would occur along the top of the seacliff slope during a moderate to large seismic event. This could cause soil loss to as far as 15 or 20 feet back from the cliff face (would typically fail back to an inclination of between 1.3H and 1.5H:1.0V as with long-term static mass wasting of the slope).

CONCLUSIONS

Given the narrow lot configuration (upper level above the seacliff), the very steep slope down to the access roadway, depth of soil cover over portions of the lot and likelihood of saturated soils being subjected to severe ground shaking during the life of the structure, it appears the moderate to large scale soil movements could be expected. Mitigation of such risk would include 1) drilling foundation support piers several feet into the rock to secure the toe below the level of movement and provide lateral kickout resistance, 2) design structure floor support framework and drilled piers to withstand the loss of soil back 15 to 20 feet from the edge of the seacliff, 3) design outer drilled piers to withstand

lateral load from lateral soil movements and 4) provide for proper stormwater runoff disposal to decrease saturation of the seacliff.

LIMITATIONS

The analyses, conclusions and recommendations contained in this report are based on site conditions as they existed at the time of the study, and assume soils and groundwater conditions exposed and observed at the site during our visit are representative of soils and groundwater conditions throughout the site. If surface development or subsurface conditions or assumed information is found to be different, we should be advised at once so that we can review this report and reconsider our recommendations in light of the changed conditions. If there is a significant lapse of time between submission of this report and sale of the property, or if conditions have changed due to acts of God or construction, at or adjacent to the site, it is recommended that this report be reviewed in light of the changed conditions and/or time lapse.

This report was prepared for the use of the owner and buyer in the evaluation of the subject property. It should be made available to others for information and factual data only. This report should not be used for contractual purposes as a warranty of site surface or subsurface conditions. It should also not be used at other sites or for projects other than the one intended.

We have performed these services in accordance with generally accepted geologic and engineering practices in northern California, at the time the study was accomplished. No other warranties, either expressed or implied are provided.

Respectfully Submitted,

THE GALLI GROUP
ENGINEERING CONSULTANTS

Ed Busby, C.E.G.
Senior Engineering Geologist

REGISTERED GEOLOGIST
EDWARD G. BUSBY
No. 1305
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

Maurice Gallarda, P.E.
Principal Engineer

REGISTERED
MAURICE W. GALLARDA
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CIVIL
STATE OF CALIFORNIA

12422

Louise A. Campbell
1015 Pebble Beach Drive
Crescent City, CA 95531-3559
Telephone/Fax: 707-465-6457

December 7, 2001

Hand Delivered

City of Crescent City
Planning Commission
377 "J" Street
Crescent City, CA 95531

Dear Commission Members:

Re: Project CDP 01-02 – Tom Kraft

I recently purchased a home at 1015 S. Pebble Beach Drive. My home is located directly across the street from the access road to Preston Island, a road that runs directly beneath the property involved in the above-referenced project. I would like to submit the following observations and concerns for your consideration in making a decision regarding this project.

First, I am greatly concerned about the geology of the property upon which the proposed home is to be built. My friend and I often walk down this road to view the waves breaking over the rocks at high tide and to poke in the tide pools at low tide. I have attached several pictures I took after a light rain in November that show recent erosion, gullies from past erosion, exposed roots of large trees caused by erosion, and holes in the road due to spring activity. The rocks in the area are visibly full of cracks and deep fissures, and water is continually seeping from the hillside. When you walk along the road and further north on the beach, one only has to look along the cliff to see the problems homeowners are already experiencing with erosion. Just north of the above-referenced property, a driveway shows major evidence of slippage, and a home several lots north of that one reflects a retaining wall that had to be built to preserve the integrity of the hillside. My concern is that the drilling and ground disturbance due to the building process will cause additional fissures to develop, thus allowing even more water to seep from the slope and more erosion to occur to the already narrow piece of property on the flat. I have been told that the winter storms generate 90 to 100 mph winds against the bluffs and homes on Pebble Beach Drive, no small force to be reckoned with. Therefore, we must be ever vigilant in the use of the property in order to protect the land, our citizens, visitors, and the environment. It is difficult for me, an obvious layman, to believe that this property is suitable for building based on what I have observed in the six months I have been in residence. I have read the report from Mr. Tromble, and I am sure he is a qualified structural engineer. However, I'm not comfortable that he necessarily has the expertise required to determine the stability of this fragile piece of property.

Perhaps what is needed for the peace of mind of those of us who live along this stretch of Pebble Beach Drive is to have an **independent geological survey** performed by a certified geologist not from this area or affiliated with the owner, proposed contractor, the City of Crescent City, the County of Del Norte, or anyone else who might be involved in the project.

My second concern regards tourism and the proposed bike and walking path described in an article in the Triplicate, a copy of which is attached for your review. In your report, you state that this portion of Pebble Beach Drive is not a scenic part of the roadway. Why, then, is there a "Scenic Route" sign on the corner of 9th and Pebble Beach Drive heading north? Living directly across the street from the access road to Preston Island, I can attest to the great number of visitors to Preston Island each day, hundreds in the summer months – people walking and biking, tour buses, groups of school children in the fall, motor homes, etc. If this bike and walking path is approved, I'm sure an even greater number of people will come to the area. I can't tell you how many people I see just standing on the above-referenced property looking out over the rocks beneath and the ocean. This proposed building would eliminate that option for our citizens and visitors. That brings me to the next issue -- the safety of these people, and this should be a primary concern for the city. Not only should the safety of our residents be important, but also since tourism is a major source of revenue for our city, any negative publicity because of someone getting injured by falling rocks or debris could be damaging to the tourism business.

The citizens of Crescent City are fortunate, indeed, to be able to live in such an incredibly beautiful and scenic area, and it gives me great pleasure to see so many travelers being able to enjoy the beauty we see each day. There is so little accessible coastline left in California, and I would like to see these views preserved for future generations.

Thank you for this opportunity to express my opinions and observations regarding this proposed project, and I trust you will consider the issues I have raised when making your decision.

Sincerely,

Louise A. Campbell

Louise A. Campbell

Enclosures

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PROJECT CDP 01-02 TOM KRAFT

NEW SLIPPAGE NEAR LOESS ROAD ENTRY

15922

111

PROJECT LDP 01-02 TOM KRAFT

EROSION / SLIPPAGE BENEATH BUILDING SITE

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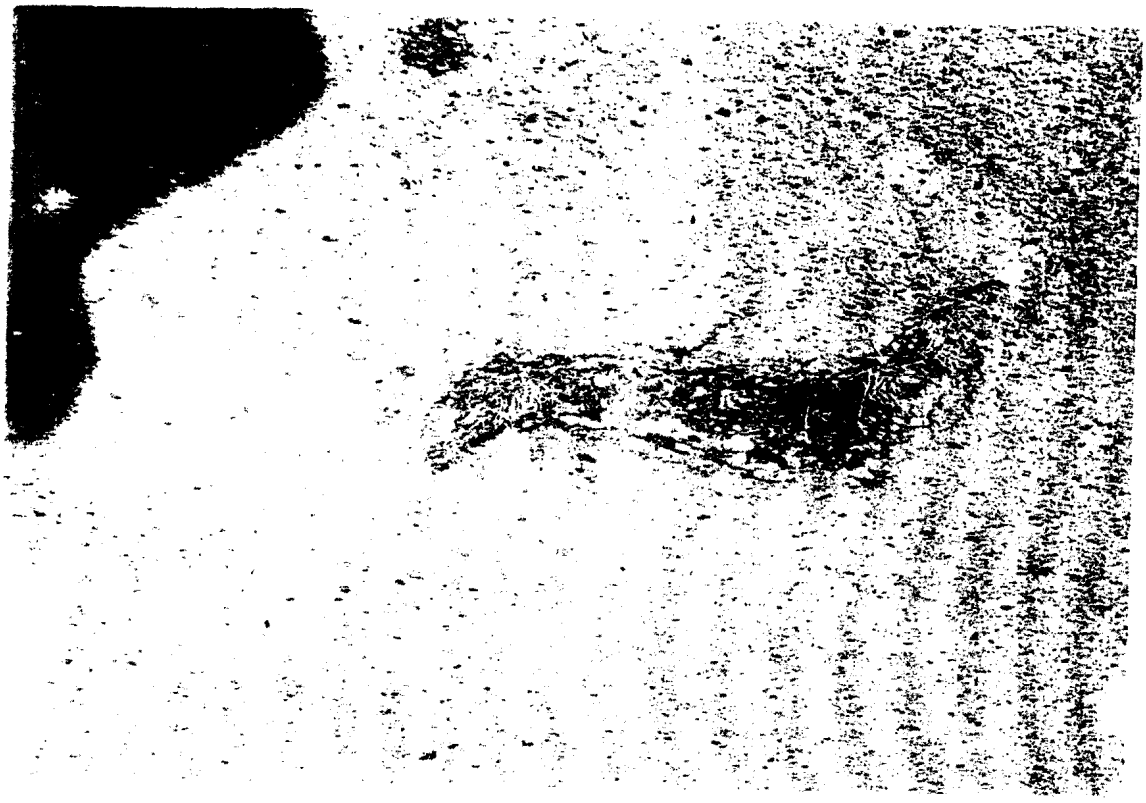
11/01

PROJECT CDP 01-02 TOM KRAFT



HOLES IN ACCESS ROAD DUE TO SPRING ACTIVITY

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The Daily Triplicate

Serving Del Norte County Since 1879

35 cents – No. 477 Vol. 121 – Thursday, October 25, 2001. www.triplicate.com

Pebble Beach coast trail moves ahead

y Jennifer Grimes
iplicate staff writer

A plan to make Pebble Beach Drive an infor-
ative, interpretive and recreational portion of
ne coastal trail is moving forward this week.

Del Norte County staff members presented the
etails of the project Tuesday and say there's a
ood chance of outside funding.

"For most of the visitors from Canada and
ates north, Del Norte County is their first obser-
ation of California's coastline. The county and
ne community as a whole are striving to make
nat first experience one which will leave a feeling
nat the person has learned something which ben-
its them," reads a justification for the project
ritten by the county community development de-
artment.

A bicycle lane will be installed and exhibits on coastal and marine life will be erected along Pebble Beach Drive if the funding comes through from the state Department of Parks and Recreation.

"This project will also result in creating an essential link in the statewide Coastal Trail," the report says.

The Pebble Beach enhancement project will also create a pedestrian- and bicycle-friendly connection between South Beach and Point St. George.

To get ready for the project, the county has purchased land on the ocean side of Pebble Beach Drive for the pathways and displays.

Wooden or recycled plastic plankways will be used for the path. The cost of the project is estimated at $600,000.

(See *Trail*, Page 3A)

The Daily Triplicate/Stephen M. Cr

A bicyclist pedals up the hill on Crescent City's Pebble Beach Drive.

Trail: Assemblymember Virginia Strom-Martin endorses project

(Continued from Page 1)

Most of that cost will be covered by the Urban Recreational and Cultural Centers grant the county is applying for. The remainder of the funds is expected to come from the state roads funds, according to Ernie Perry of the community development department.

State Assemblymember Virginia Strom-Martin has endorsed the project, which was a crucial step in the grant process, according to Perry.

With county Supervisor Martha McClure abstaining and Supervisor Jack Reese absent, the remaining three supervisors voted unanimously Tuesday to send the project description on to the state.

RE: PROJECT CDP 01-02 TOM KRAFT

MICHAEL & MARTHA SACVUZZO
1127 South Pebble Beach Drive
Crescent City, CA 95531
(707) 464-4866

February 11, 2002

CITY OF CRESCENT CITY
Planning Commission
377 "J" Street
Crescent City, CA 95531

PLEASE READ AT THE PUBLIC MEETING ON PROJECT CDP 01-02 TOM KRAFT PROPOSED PROJECT MADE PART OF THE RECORD.

Dear Chairperson and Members:

As a 45 year resident of Pebble Beach Drive (my wife and I having built here in 1957), I am requesting that the Crescent City Planning Commission insist on an All-Inclusive Environmental Impact Report on the Tom Kraft permit application for Project CDP 01-02.

Our home is directly across the roadway from this proposed project and I can assure the Commission that there are multiple impacts to be addressed before action is taken on this plan for a coastal site which can only be described as extremely fragile.

The matter of soil erosion, of course, is high on the list of concerns. It should be noted here that some 20 or 25 years ago, Pebble Beach Drive power lines within the city limits were placed underground under the California Public Utilities Commission's Program to provide for such conversions of overhead lines in scenic areas designated by governing bodies of cities and counties. The City installed our street lighting system as part of the local conversion project.

But, because of erosion and soil slippage, several street light standards on the west side of Pebble Beach Drive have been lost or placed in different locations.

This should be clear evidence of the vulnerability we face in soil stability in our rightfully called scenic area. This also happens to be probably the heaviest travel scenic route in Crescent City, linking with Del Norte County's section of Pebble Beach Drive.

I'm submitting photographs I have taken to further illustrate problems and related factors that must be considered as the Planning Commission reviews the Kraft application and its far reaching areas

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of concern. Drainage, of course, is one that ties to soil-slippage and the ongoing problem of erosion.

Thus, there can be no doubt that a full blown environmental impact appraisal is a must as the Planning Commission weighs the consequences of any action that might be labeled imprudent or even foolhardy.

Sincerely,

Michael Scavuzzo
Martha Scavuzzo

MICHAEL & MARTHA SCAVUZZO
MMS/rsw

October 3, 2002

Honorable Mayor and City Council
City of Crescent City, City Hall
377 J Street
Crescent City, CA 95531

PLEASE READ AT THE PUBLIC MEETING AND MAKE PART OF THE RECORD

SUBJECT: APPEAL OF CITY PLANNING COMMISION APPROVAL OF PROJECT CDP 01-02 AT 1100 PEBBLE BEACH DRIVE

Dear Honorable Mayor and City Council:

I would like to take this opportunity to reiterate my concerns regarding the proposed lot development at 1100 Pebble Beach Drive. I have appeared before the City's Planning Commission and elaborated in some details that this project requires further environmental review and consideration. The focus of my concerns regarding the safety and stability of any development at this location are addressed in the Geotechnical Report prepared by the Galli Group, a geotechnical consulting firm located in Grants Pass, Oregon. I would like to point out that the Galli Group is staffed with certified engineering geologists and geotechnical engineers licensed to practice in California.

The objective conclusion of their study indicates a serious concern regarding the possibility of seismic shaking at the top of the sea cliff slope on 1100 Pebble Beach Drive, particularly given the narrow lot configuration, depth of soil coverage and likelihood of saturated soils, resulting in large scale soil movements. The Galli Geotechnical Study also indicates the possibility of slope degradation, from 10 to 15 feet back from the current location, if development were to occur at this site.

The Galli Geotechnical Report is at odds with the applicant's (Busch Geotechnical) report for this site. Based on a review of the California Environmental Quality Act regulations, according to Section 15064 (g) Determining the Significance of the Environmental Effects Caused by a Project it states, "After application of the

principles set forth above in Section 15064 (f) and in marginal cases where it is not clear whether there is substantial evidence that a project may have a significant effect on the environment, the lead agency shall be guided by the following principle:

"*If there is disagreement among expert opinion supported by facts over the significance of an effect on the environment, the Lead Agency shall treat the effect as significant and shall prepare as EIR.*" I am also concerned with the fact that no detailed plans and specifications have been presented to the City staff for their review of this location. Based on the information included in the Galli Geotechnical Study and the appropriate sections 150644 (g) of C.E.Q.A., I would request that the City Council reconsider any permit and environmental approval for development of 1100 Pebble Beach Drive, until such time as detailed site development plans are submitted, a full E.I.R. is prepared for the project addressing in detail the issues identified in the Galli Geotechnical Report, and until such time as the project is accepted for the review of its California Coastal Development permits. I will be available to discuss my concerns with the process at you October 7, 2002, City Council meeting,

Sincerely,

Michael J. Scavuzzo
1127 S. Pebble Beach Drive
Crescent City, CA 95531

22422

LEE TROMBLE ENGINEERING
879 J Street, Ste. A
Crescent City, CA 95531

Phone (707) 464-1293
FAX (707) 465-8358

August 22, 2001

Tom Kraft
Beth Forest Family Trust
P.O. Box 35
Fort Dick, CA 95538

re: Soils and Foundation Investigation
APN 118-300-03

Dear Mr. Kraft:

This is to provide you with the results of our investigation of soils conditions on APN 118-300-03 in Crescent City, CA. I have completed and performed the necessary field work and literature research in order to draw conclusions regarding soil conditions and to make recommendations for foundation design and construction for the proposed development.

The site is a narrow strip of land lying on the west side of Pebble Beach Drive overlooking the Pacific Ocean. The purpose of this report was to determine if sufficient land area is available for single family residential development of the site, and to identify any hazardous slope instability or soils conditions existing at the property relative to the proposed development. Further, this report is to provide information regarding the soils and to offer recommendations as to the type of foundations that should be used and the soil capacity for those foundations.

This report can be used to aid in the preparation of plans and specifications for a proposed residence on the site. For the purposes of this report, I assumed a two story, wood-framed structure. Water and sewer service are both from the City of Crescent City.

I visited the site on numerous occasions this year. My visits consisted of traversing and inspecting the site, giving particular attention to the coastal bluff, the land below and the general terrain encompassed within and adjacent to the proposed building site. We also excavated a backhoe test pit to determine the soil strata. We referenced maps prepared by the USGS and California Division of Mines and Geology, as well as reports for nearby properties. Included with this report is a location map which shows, among other things, location of the test pit, the coastal bluff, and surrounding terrain.

The site is about 50 feet MSL on the western edge of a broad uplifted marine terrace overlooking the Pacific Ocean. The potential development area is narrow due to the fact that it is constrained by the coastal bluff to the west and the 20 foot front yard building setback from the easterly property line along Pebble Beach Drive.

Bedrock at the site is the Jurassic-Cretaceous Franciscan Melange (map symbol KJFu), a heterogeneous mixture of small to large blocks of erosion resistant rocks within a sheared shale matrix. The bedrock is visible along and just off the beach as isolated seastacks and wave-cut rocks. On land, bedrock is recognizable within and adjacent to the bluff face.

Marine terrace deposits overlay the bedrock. The terrace sediments consist predominately of marine terrace sands. Over the terrace sediments are silty sands and sandy silts arriving from the upland by soil development and mass wasting processes.

The coastal bluff consists of exposed elements of bedrock and the marine terrace deposits. Our excavation and the exposed bluff face indicates the depth to bedrock is approximately 15 feet below the ground surface. The depth to bedrock appears to be consistent throughout the proposed development area. The base of the bluff is buttressed by a paved road which transverses down and across the bluff face. This road provides public access from Pebble Beach Drive to Preston Island and the beach. The bluff height, measured from the building terrace to the beach access road, varies from approximately 25 to 40 feet. It is my understanding that this road was constructed many years ago as a haul road when rock from Preston Island was blasted loose, excavated and transported off-site. The road appears to be constructed on a rock fill embankment. Below the road is a rock fill slope, consisting primarily of large boulders, and a steeply sloping beach below.

The beach access road provides excellent protection of the coastal bluff at this location. At many locations elsewhere along Pebble Beach Drive, where the bluff face is unprotected and/or the marine terrace deposits are relatively deep, the coastal bluff has experienced back-wasting and varying degrees of coastal bluff retreat. However, the subject site has experienced no discernible retreat since construction of the Preston Island access road. This is due to the fact that storm surge wave action almost never overtops the access road. Furthermore, if overtopping did occur, the bedrock exposed on the bluff is extremely resistant to episodic wave-cut erosion. Therefor, at the subject site over a 40 year economic life span, we can conclude that the coastal bluff rate of retreat due to wave undercutting is essential zero.

The sediments overlying the bedrock are erodable if subject to surface water runoff. Excepting one location where foot travel has exposed the erodible sediments, the sediments are well vegetated. It is important that this vegetation remains undisturbed. Provided the vegetation remains in place and runoff does not become concentrated on the terrace edge, I would expect little back wasting of the terrace sediments overlying the bedrock.

To maximize the useable building area and to avoid potential differential settlement due to soil creep near the bluff edge, it is our conclusion that poured in-place reinforced concrete piers bearing on bedrock be used to support any and all proposed structures. The piers must be cast integral with reinforced concrete grade beams. The use of piers will allow the structure to remain intact even if shallow erosion or "creep" of the exposed terrace bluff sediments occur. The piers must be setback a minimum of 5 feet from the edge of the bluff.

Our mapping of the site indicates that sufficient area, albeit narrow and rectangular, exists to allow for single family residential development of the site. Although the piers must be setback from the bluff edge, the grade beams can be cantilevered out to the edge of the bluff. I would not

recommend any development or structure coverage beyond (west) of the top of bluff. The approximate foundation building area is shown on the attached location map. This area, which begins 50 feet southerly of the north property line, is roughly 20 feet wide by 100+ feet long. The corresponding building envelope is roughly 25 feet wide.

GEOLOGIC HAZARDS AND LEVELS OF RISK

We considered the following potential geologic hazards and addressed the associated level of risk of each at the site: 1) coastal bluff instability; 2) adverse soil conditions; 3) seismic shaking; and 4) liquefaction.

The coastal bluff instability, adverse soil conditions and resulting mitigations were discussed previously. Provided a properly designed and sited pier and grade beam foundation is used to support the structure, the potential of damage due to coastal bluff instability or adverse soil conditions is LOW.

SEISMIC SHAKING

Del Norte County lies within one of the most seismically active regions of California. Numerous seismic sources are capable of generating earthquakes that could produce strong ground shaking at the site.

Since 1850, the Crescent City area has felt at least 15 moderate earthquakes (an earthquake that registers 5.0 M or greater on the Richter scale). Many of these earthquakes generated moderate to strong ground shaking. Estimates are that a 7.0 M earthquake is the largest earthquake likely to occur once in a 100-year period within a circle of 100-km centered on Crescent City.

Another capable seismic source is the Cascadia Subduction Zone (CSZ), an area at the base of the continental slope where the Gorda Plate (or another plate, to the north) subducts (dives down) beneath the North American Plate. A "great" earthquake (8.5 M or greater) could be produced by the rupture of this "megathrust", which extends offshore from near Cape Mendocino into Canada. A CSZ event would produce a regional catastrophe possibly affecting the entire Pacific Northwest. At the site, the seismic shaking would be very intense.

The historic record and regional tectonic setting suggest that the probability that the site will experience strong ground shaking during the project design life (40 years) is HIGH. The risk that the shaking itself will cause moderate to severe damage to a well-constructed wooden frame structure built on the site using high quality materials and workmanship is LOW for all seismic sources except the CSZ. The risk of damage during a CSZ event probably is HIGH.

LIQUEFACTION

Liquefaction is the sudden loss of shear strength caused by an increase in pore water pressures within saturated sediments. The liquefaction potential of geologically recent, saturated,

poorly consolidated fine sands, silty sands, and sandy silts is highest. For a structure supported by end bearing piers on bedrock, the risk that a structure will be damaged as a result of liquefaction or liquefaction induced ground failure is negligible.

RECOMMENDATIONS

REC 1. Support the building on an engineered foundation consisting of grade beams and reinforced concrete end-bearing piers. The foundation building area is shown on the location map. Design all load bearing slabs, if any, as structural slabs. We estimate the depth to bedrock at approximately 15 feet. The westerly edge of the piers must be setback a minimum of 5 feet from the top of bluff. The piers must also be setback a minimum of 50 feet from the north property line. Care should be exercised to keep pier holes free of debris, loose cuttings and fall-in prior to placing reinforcing steel and concrete.

Resistance to lateral loads may be provided by passive pressure equivalent to a fluid weighing 450 pounds per cubic foot (pcf), beginning at a depth of 2.5 feet and acting over 1.5 pier diameters.

REC 2. Slab areas should be prepared by sub-excavating under the slab area a minimum of 12 inches, compacting the exposed subgrade to 90% relative compaction, and backfill the area with Class 2 aggregate base compacted to 90% relative compaction. The concrete floor slab should be supported on four (4) inches of ¾ minus clean, crushed gravel and three (3) inches of compact coarse sand or gravel separated by a vapor membrane, "MOISTOP", or equivalent. The gravel should be compacted by 3 or more passes of a vibrating plate compactor.

REC 3. Design for Seismic Zone 3 per current Uniform Building Code guidelines.

REC 4. Direct all roof and pavement runoff away from the bluff.

REC 5. Maintain vegetation along the bluff edge and permit no foot traffic to the beach via the small gully near the south side of the building area.

REC 6. Driveway areas shall be prepared by removal of the sod layer, 6" deep surface scarification and compaction to 90% minimum relative compaction before placement of the pavement structural section or engineered fill. The pavement section shall be 0.2 feet (min.) of compacted asphaltic concrete placed over 0.5 feet of aggregate base (minimum) compacted to 95% relative compaction. Asphaltic concrete and aggregate base shall conform to Cal Trans Specifications.

The data and conclusions presented herein are based on interpretations of surface features, natural soil exposures, our exploratory hole and literature research. Varying soil conditions are possible, however, we feel confident that there is no significant variations in soil types within the proposed building area. However, we recommend that at the time of

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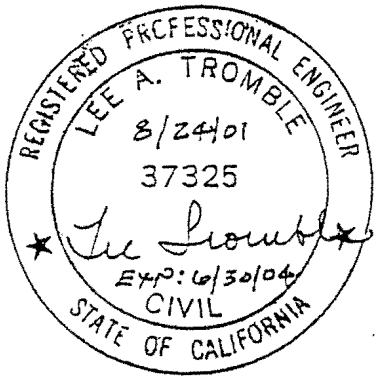
construction, we verify soil conditions under the building. This can easily be done at the time the pier excavations are made.

Acceptably low geologic risks and soils hazards are based on the assumption that geologic and climatic processes in the region will continue to act as they have in the recent geologic past and will continue to do so over the economic life span of the project. Because the site is located in a tectonically active region that could be struck by a catastrophic earthquake followed by a tsunami, nothing in this report should be construed to imply a guarantee of safety. The risk of this event is no higher at this site than at many other nearby sites in Crescent City and along the coast of the Pacific Northwest in general. This means that future landowners must be willing to assume the level of risk related to large scale, improbable "Acts of God" such as tsunamis or land sliding caused from catastrophic seismic shaking.

I trust this provides you with the soils hazards and slope stability information necessary for development of this site. If you need any additional information or if I can be of further assistance, please contact me.

Very truly yours,

Lee Tromble



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LEE TROMBLE ENGINEERING

[illegible] J Street
Crescent City, CA 95531

Phone (707) 464-1293
FAX (707) 465-8358

EXPLORATION LOG

OWNER BETH FOREST FAMILY TRUST
APN 118-300-03
ADDRESS P.O. Box 35
DATE MAY 8, 2001
FORT DICK, CA
LOG BY LT
JOB NO. 1018
HOLE NO. 1
REMARKS BACKHOE

DEPTH (FT.)	DESCRIPTION / REMARKS	COLOR	MOIST.	SAMPLE
0	SILT, CLAYEY, SANDY (FINE) MED. STIFF	VERY DARK BRN	DAMP	No
1.3'				
2	CLAY, SANDY (FINE) STIFF	BROWN	MOIST	No
4	SAND (FINE), MEDIUM DENSE LIGHTLY CEMENTED	YELLOW BRN.	MOIST	No
5.5'				
6	SAND (FINE), CLAYEY, MED. DENSE	GRAYISH BRN.	MOIST	No
8.5'				
10	CLAY (SANDY) MED DENSE	BLUEISH GRAY	MOIST	No
12	CLAY, STIFF	BROWN TO GRAYISH BRN	MOIST	No
14				
16	BEDROCK @ 15° ±			
18				
20				

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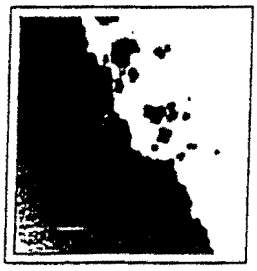

December 20, 2001

BUSCH GEOTECHNICAL CONSULTANTS

Tom Kraft
Beth Forest Family Trust
P.O.B. 35
Fort Dick, CA 95538

Site-Specific Geotechnical Report, Kraft Bluff-Top Property, Pebble Beach Drive, Crescent City, California

EXECUTIVE SUMMARY

A total of about 13 feet of topsoils, subsoils, and uplifted marine terrace deposits overlie the regional bedrock within the proposed building area. These soils have diverse geotechnical engineering properties but, excluding the topsoils, will competently bear a typical single-family residence with a low risk of damage in excess of conventional tolerances. However, because of the perceived hazard of bluff-top instability, especially during a long-duration, intense Cascadia subduction zone earthquake of 8.4 M_w or greater, using a deep foundation system is prudent. The lowest risk of damage will be achieved if the home superstructure rests on an engineered pier and grade beam foundation in which reinforced cast-in-place concrete piers extend through the marine terrace cover sediments to bear within the dense sandstone bedrock present at the site. Residential run-off should be controlled to prevent concentrated water from spilling over the top-of-bluff and causing gullying and/or a localized bluff failure.

7966

P.O. BOX 222 • ARCATA, CA 95518-0222 • 707-822-7300 • FAX 707-822-9011
Geotechnical and Geologic Studies for Land Development and Resource Management

INTRODUCTION

Contract information and Purpose of the Report

We are providing you with this report under the terms of BGC contract #01-090. **The purpose of the report is to present site-specific soils information, a geologic hazard and risk evaluation, results of a slope stability analysis, and geotechnical recommendations.** The report contains a map showing the location of the proposed building area, exploration holes, and a profile used to model the stability of a bluff below the proposed building area. Our stability analysis of the profile uses slope geometry, stratigraphy, and water table details explained in text and shown on Figures 6 and 7.

Site Description

The Kraft property is located west of Pebble Beach Drive in the vicinity of Preston Island, in Crescent City, California. The site is in section 29, T16N, R1W, HBM, of the USGS Crescent City 7.5-minute quadrangle map (see Figure 1). The owners plan to construct a ~2000 ft^2, mostly single-story, wood-frame, single-family residence on the lot. As discussed in a foundation-soils report prepared by project engineer Lee Tromble, **the home will be supported on reinforced grade beams resting on end-bearing reinforced concrete piers founded into bedrock** (TE, 2001).

Scope-of-Work and Investigation Methods

Generally stated, our scope-of-work called for us to do those field and office tasks necessary to complete an engineering geology investigation appropriate to identify geologic hazards and risks at the site, characterize the strength of the site soils, and provide site-specific parameters for the design of the piers.

We use standard practices and professional standards of care for all of our studies, and we follow American Society of Testing and Materials (ASTM) procedures for all sampling and lab testing. This report contains field and lab data, the results of a preliminary factor-of-safety (FOS) analysis, a summary of conclusions, and geotechnical recommendations designed to minimize the risks associated with identified foundation soils hazards. We also provide the pertinent seismic design information required by the 1997 edition of the Uniform Building Code (ICBO, 1997).

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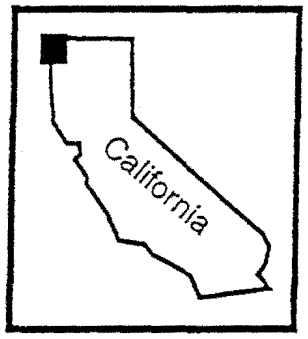
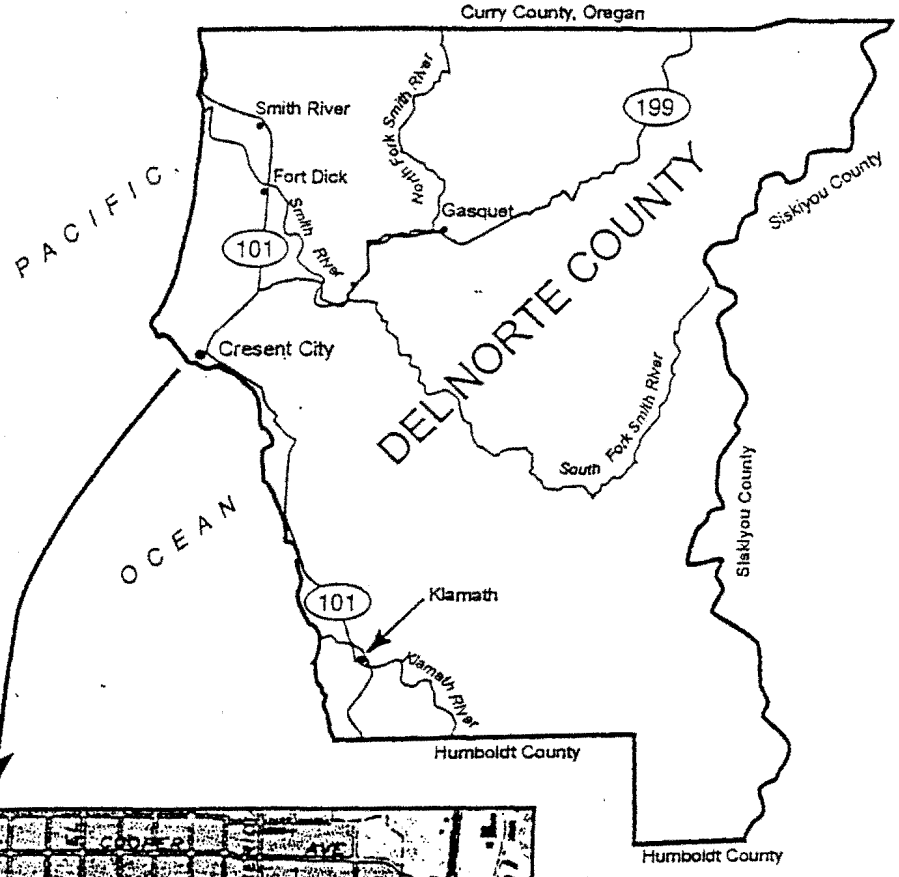
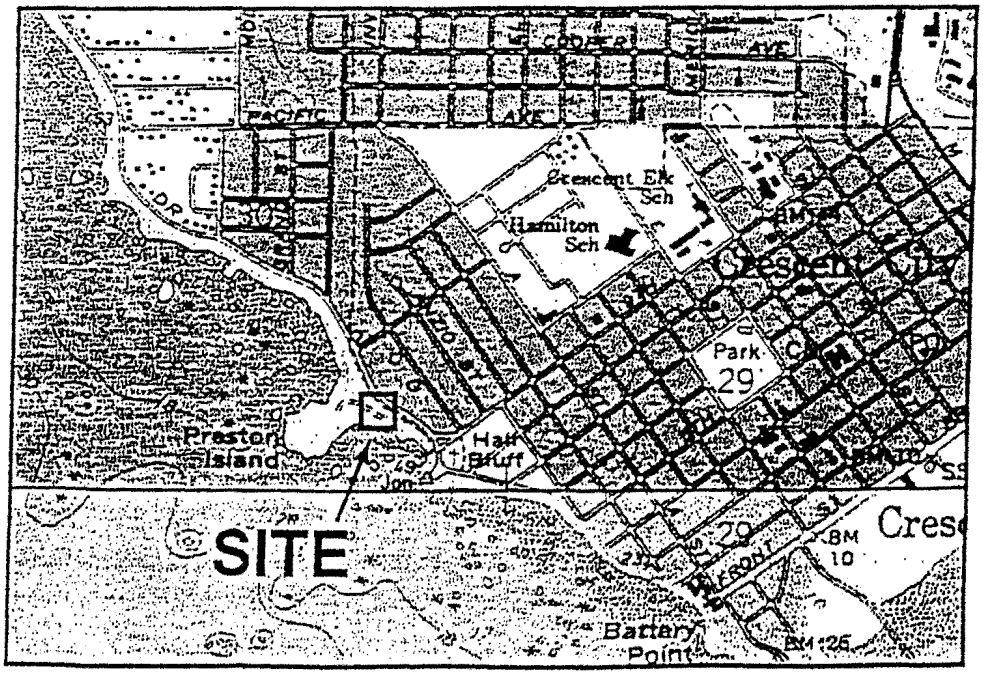
Figure 1. Nested maps showing the location of the Kraft property in Crescent City, CA. Various scales. The topographic map is a portion of the USGS Crescent City 7.5-minute quadrangle map, scale, 1:24,000.







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Following a reconnaissance-level site inspection made on 11/2/01 by BGC principal, Bob Busch, Ph.D., C.E.G., accompanied by Lee Tromble, R.C.E., a two-person crew consisting of BGC Staff Engineering Geologist Steve Bacon and Staff Geologist Steve Tordoff did fieldwork on November 15, 2001, collectively spending about 8 hours onsite. They explored soils in the proposed building area using a 3.5"-diameter hand auger and logged the hand-auger borehole, BGC-1, using the Unified Soils Classification System (USCS; Appendix IB). They collected each "undisturbed" soil sample (n = 7) in a 2.365"-I. D., heavy-wall, brass tube affixed to a manual impact sampler. A BGC lab technician determined soil index parameters in our Arcata, CA, soils lab. Measured parameters include dry density, moisture content, void ratio, "quick" undrained shear strength (by torvane), undrained shear strength (by direct shear), and unconfined compressive strength (by pocket penetrometer). For the results of our lab tests, see Appendices IA, IC, and ID. Staff Geologist Ronna Bowers, assisted by Steve Bacon, wrote the draft of this report.

ENGINEERING GEOLOGY

Encapsulation of the Regional Tectonic and Geologic Setting

The project site is on the Crescent City coastal plain, a low-lying surface of negligible relief that lies on the accretionary margin of North America (see Figure 2). The region is tectonically active, and numerous structures are capable of generating strong ground motion at the site (see Appendix V). Of the active and potentially active regional structures, the Cascadia subduction zone (Csz) and the Big Lagoon-Bald Mountain fault are of greatest concern.

The Csz is the convergent boundary between the underthrust Gorda plate and the North American accretionary margin. The trace of the megathrust of the Csz lies about 78 km (46 mi) west of the site and passes beneath the site at about 13.5 km (8 mi) in depth (assuming a 11° dip on the fault plane, per Toppozada et al., 1995). Structures of the Csz fold and thrust belt are recognizable offshore by the topography of the sea floor and in deep seismic reflection profiles that show faults displacing Pleistocene sediments (Clarke and Carver, 1992; Clarke, 1992). The most recent Csz event occurred in 1700 AD (Atwater et al., 1991; Satake et al., 1996). An evaluation of the potential seismic hazard of the southern end of the Csz suggests that past Csz events have been on the order of 8.5 M or higher (Clarke and Carver, 1992).

Petersen et al. (1996) indicate that the earthquake likely to cause the dominant hazard for peak ground acceleration at 10% probability of exceedance in 50 years for "firm rock" site conditions is within 5 km of the site, that the magnitude of the quake is likely to be between 7.3 and 8.3 M_w, and that the peak horizontal rock accelerations during this event are likely to be 0.3 to 0.4 g. http://eqint.cr.usgs.gov/eq/html/zipcode.shtml notes that the probable ground acceleration with 10% exceedance is 0.33 g, 0.78 g at a 0.2 sec spectra acceleration (SA), 0.67 g at a 0.3 sec SA, and 0.29 g a 1.0 sec SA.

Based on the currently modeled location of the Csz and the Big Lagoon - Bald Mountain fault, the State of California maps "shaded near-source zones" for each of the active and potentially active faults in the State. As mapped by the State (DMG, 1998), the shaded near-source zone for the Csz is >15 km west of the site and for the Big Lagoon – Bald Mountain fault is ~6 km west of the site. The Csz is a Type A fault whereas the Big Lagoon – Bald Mountain fault zone is a Type B fault (per DMG, 1998).

Although the Uniform Building Code (UBC) places the Crescent City area in Seismic Zone 3, Seismic Zone 4 areas bracket Crescent City to the north and south. Seismic zoning by the State of Oregon for Brookings (ODLCD, 1998), which is ~30 mi north of Crescent City, to us suggests that new construction in Crescent City should adhere to UBC Seismic Zone 4 guidelines (see recommendations).

Additionally, there are two faults near the site, the St. George fault and the Smith River fault (see Figure 3), both of which have been recognized in offshore seismic reflection lines (Field et al., 1980; Clarke, 1992). The capability of these faults is unknown and the faults are not zoned by the State of California. Evidence for the St. George Reef Scarp fault (Roberts and Dolan, 1968) was proposed to explain an 8 to 9-m-high offshore bedrock ridge paralleling the St. George fault and the Del Norte fault (Maxson, 1933; not shown on any figure).

Well-developed flights of deformed, uplifted late Pleistocene marine terraces are not present in the Crescent City region as they are in the Brookings, OR, area (Kelsey and Bockheim, 1994; Abelli, 1988) and the Humboldt Bay and Cape Mendocino areas of Humboldt County (e.g., Stephens, 1982; Carver, 1985, 1992), but three subtle terraces are present (Polenz and Kelsey, 1999) (see Figure 4). As mapped by Polenz and Kelsey (1999), the terrace sediments (symbol Qpm2) at the site overlie a 105,000 yr-old (105 ka) abrasion platform cut into the regional bedrock, Jurassic-Cretaceous Franciscan Complex (symbol KJf) (see Figure 3).

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Figure 2. Left, Regional tectonic setting of the Pacific Northwest. Right, Physiographic setting of the Crescent City area. Both figures from Polenz and Kelsey (1999). St. George fault and Smith River fault from Clarke (1992); St. George Reef scarp from Roberts and Dolan (1968).

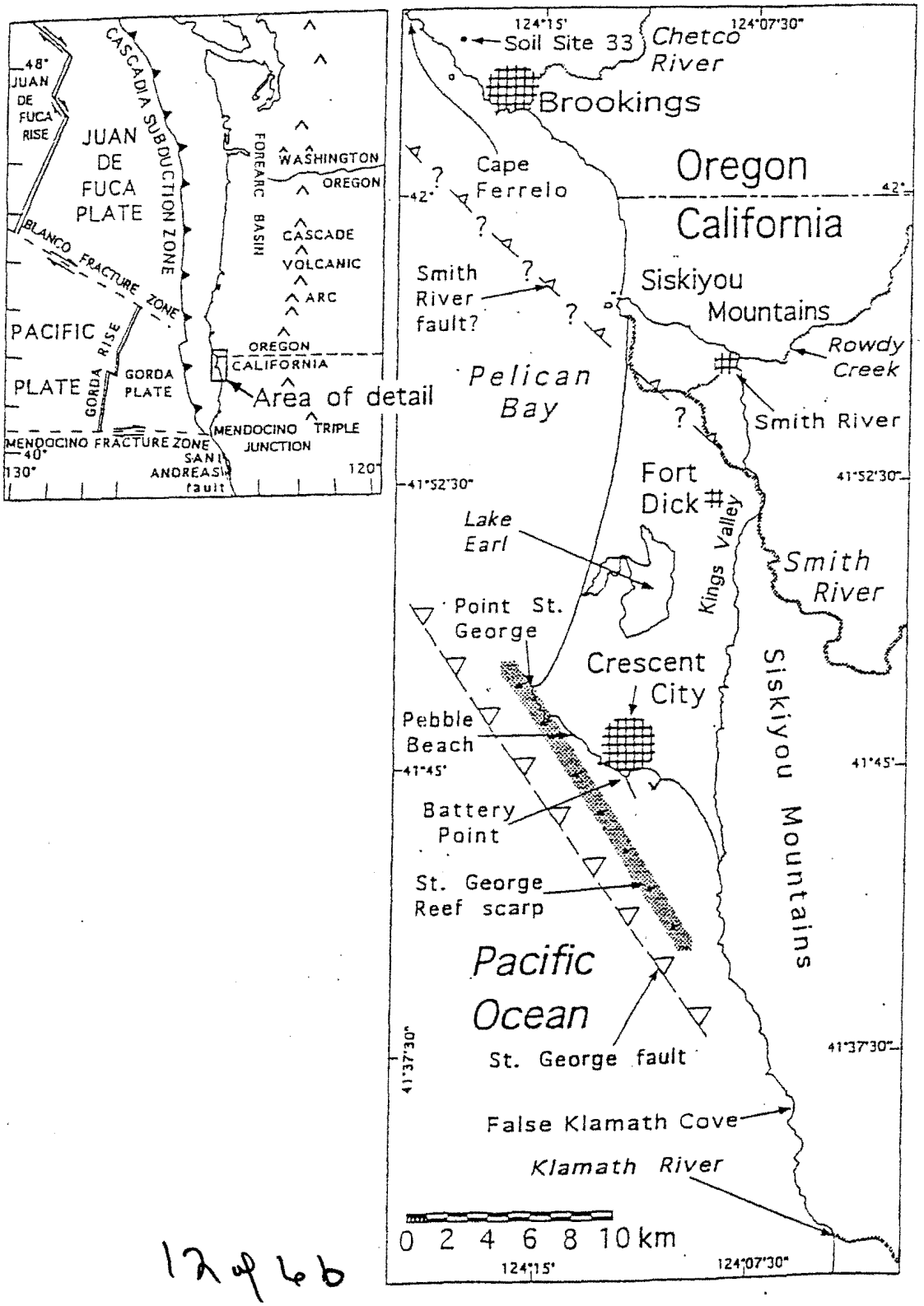

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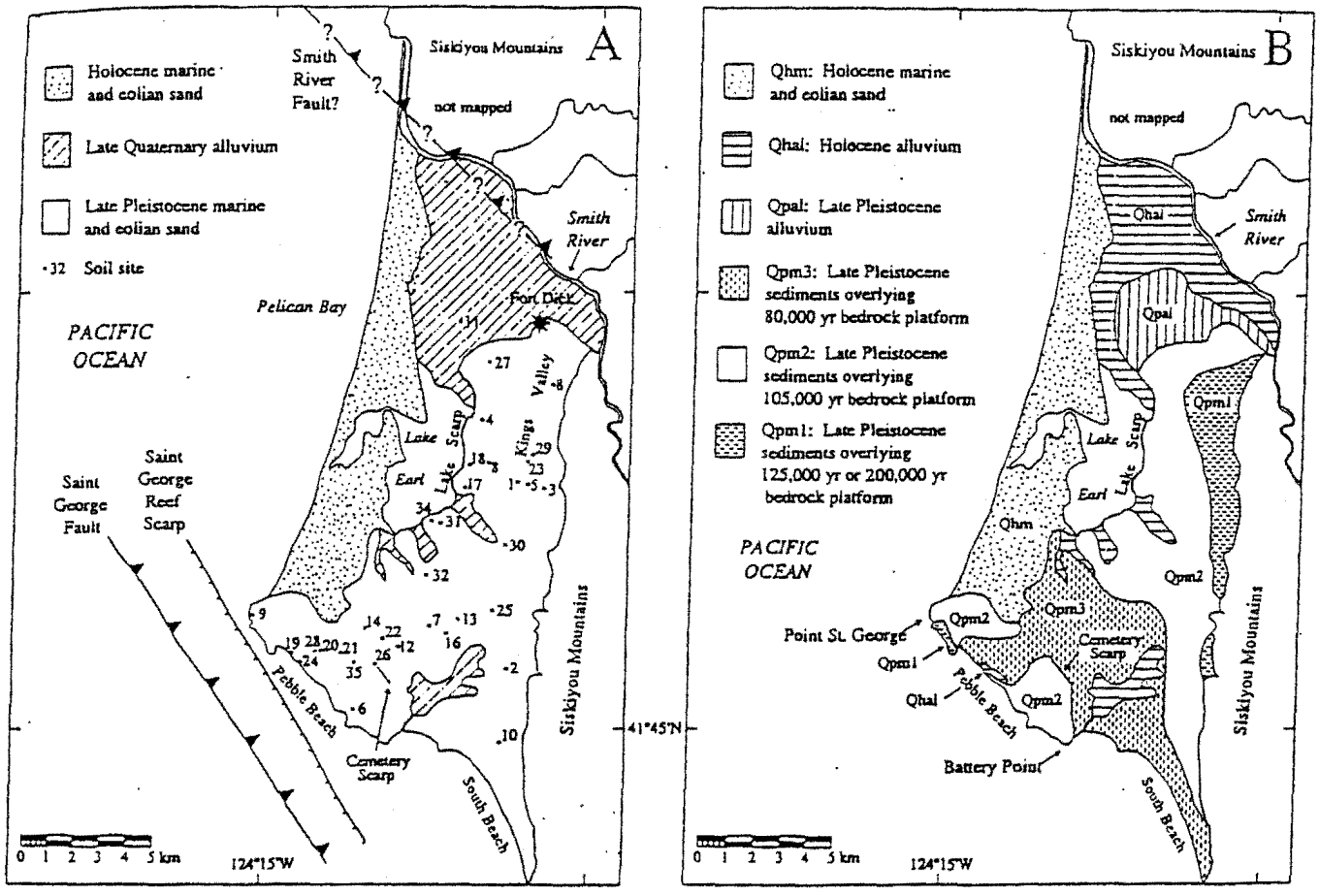
Figure 3. A, Crescent City coastal plain showing geologic provinces and soil sample sites of others. B, Quaternary geologic map of the Crescent City coastal plain showing the location of three late Pleistocene terraces (Qpm1, Qpm2, and Qpm3). Both figures from Polenz and Kelsey (1999). The Kraft property is located on Qpm2. See text for detailed discussion.



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Site Topography, Geomorphology, and Geology

The proposed building site is located on a nearly flat-lying uplifted late Pleistocene marine terrace resting on an abrasion platform cut into bedrock. The homesite is between the top-of-bluff and Pebble Beach Drive. The bluff sediments (technically, poorly consolidated rocks) are partially cemented sands and gravels estimated to be <105,000 years old (105 ka) to <83 ka in age. The sandy silt eolian soil cap is <18 ka old. A rip-rapped road to Preston Island passes beneath the site, effectively protecting the site bluff face from marine erosion.

The geophysical bedrock; lithologies of the Jurassic-Cretaceous Franciscan Complex, notably graywacke sandstone, volcanic rock, and interbedded thin-bedded argillite and siltstone, is exposed offshore as sea stacks and along the beach as "knockers" protruding from the 105 ka abrasion platform being exhumed. Here, the bedrock is mostly a highly fractured and jointed, erosion-resistant, massive sandstone.

The elevation of the lot surface is about 48 ft MSL (TE, 2001). Although the buried bedrock surface in this area of Crescent City has an average elevation of ~4 m (13.2 ft) MSL, not including protruding knobs (Polenz and Kelsey, 1999), the elevation of the bedrock surface beneath the Kraft site is much higher. Based on the TE (2001) cross-section, as verified by our borehole and bluff-face inspection data, the elevation of the bedrock surface in the building area is ~35 ft MSL (see Figure 5). Collectively, the presence of a reentrant on the north property line and a south-sloping bedrock surface south of the property indicate that the bedrock at the site is an ancient sea stack whose top was planed off. The absence of groundwater in the marine terrace sediments further supports this hypothesis (because groundwater approaching the site from inland terrace areas apparently flows around, rather than through, the site).

In the southern part of the site, along a foot path to the beach, a narrow gully channeling surface water runoff from the bluff exposes weakly consolidated cover sediments. The area is well vegetated and does not pose a threat to the homesite.

In addition, a small cutbank failure is located about 30 ft north of BGC-1, outside of the building footprint (see Figure 4). The sole of this slide is maximally ~13 ft wide. It forms a near-vertical scarp ~4 ft high about 3 ft from the bluff edge. The failure occurred because the cutbank was steeper than the marine terrace sediments and overlying colluvial soils could maintain. In this location there is no threat of removal of the toe of slope by coastal waves because a buttressed access road below protects the bluff base.

Figure 4. Map of Kraft property (modified from TE, 2001). Note the location of the proposed building area (hatched area) and TE (2001) backhoe exploration pit #1, BGC exploration hole BGC-1, and cross section A-A' (Figure 5). Scale 1" = ~30'.

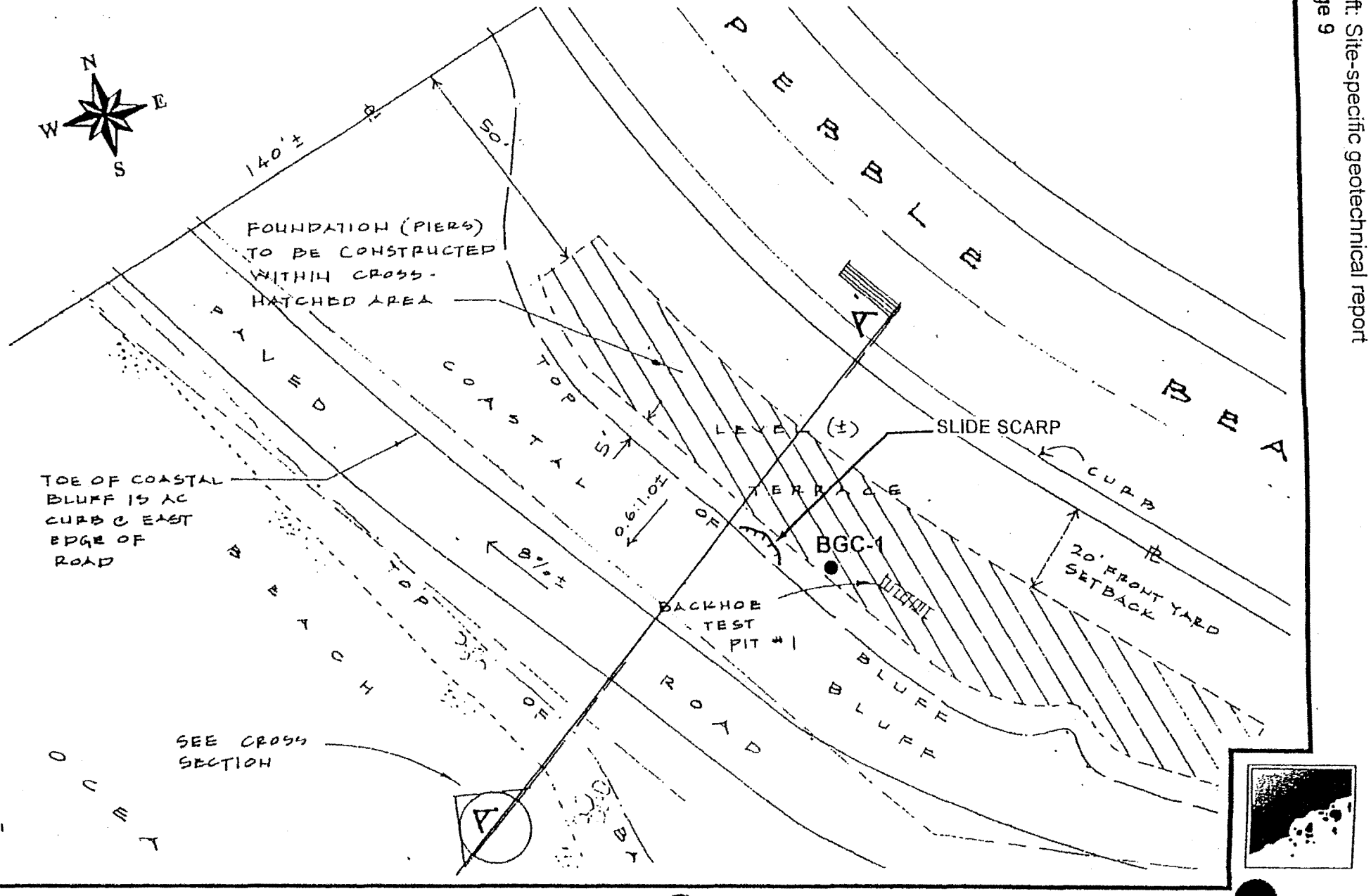
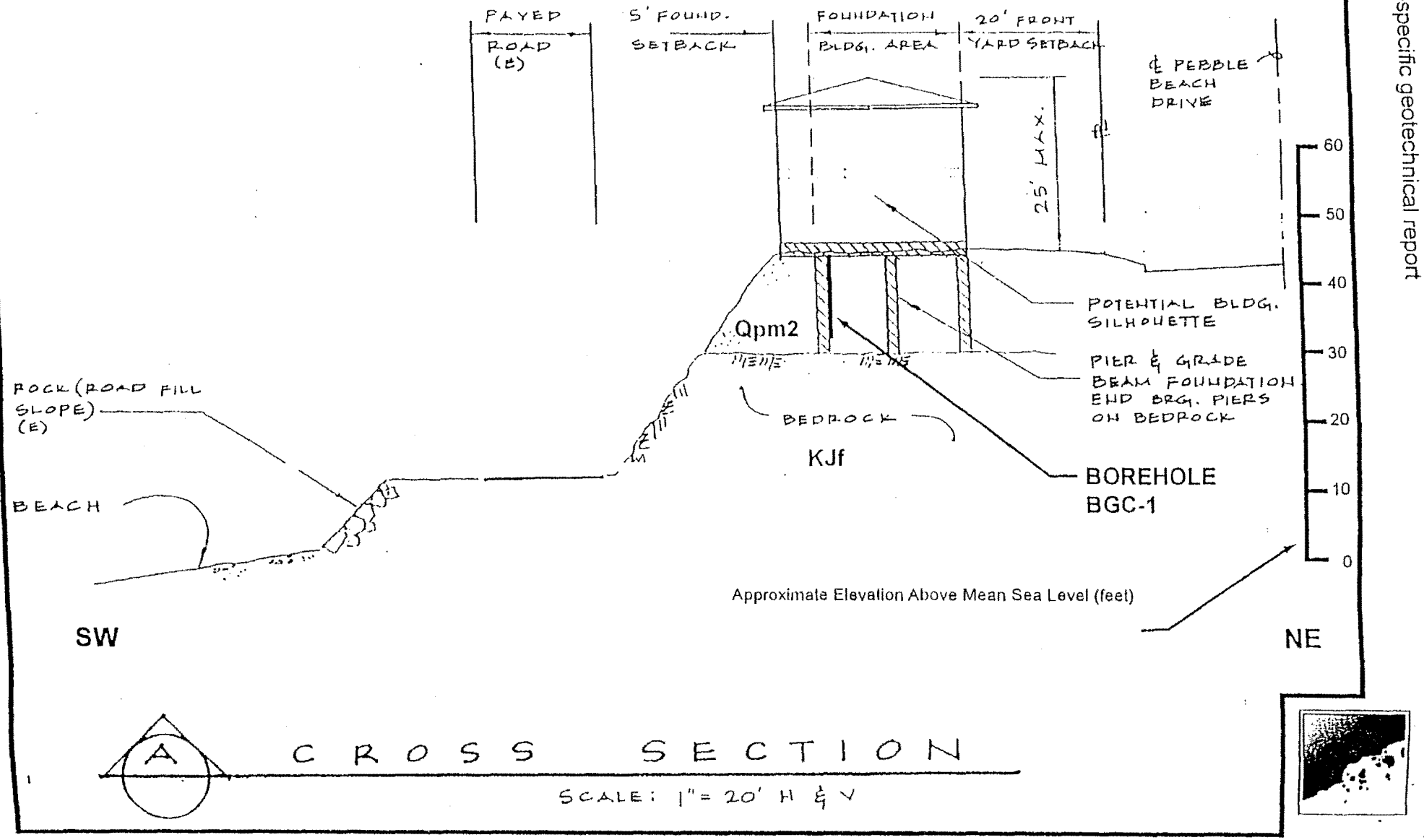


Figure 5. Critical profile of the Kraft property and vicinity. The profile, modified from TE (2001), is the "critical profile" because the home is nearest the break-in-slope at the top of the road cutbank at this location. Horizontal and vertical scale, 1" = 20'. See text for detailed discussion about slope failure processes at and below the proposed homesite. Note proposed reinforced concrete piers to bedrock.



Description of Site Soils

We hand augered borehole BGC-1 within the proposed building area (see Figure 4 for borehole location, and see Appendix IA for borehole log). To simplify, beneath dark silt topsoils (USCS: ML) are gray to yellow-brown subsoils overlying weathered bedrock. These subsoils, derived from marine terrace cover deposits, are relatively uniform yellow-brown and gray, fine-grained, matrix-supported soils composed of sand, silt, and well-rounded fine to coarse gravel clasts. Although, technically, the subsoils are poorly consolidated rocks, we will use soils terminology in this report. In general, these soils classify as clayey sands (SC), slightly clayey to silty sands (ML), silty sands (SP), and gravelly, silty sands (SM) (for details, see the following discussion). The stratigraphy we have recorded in our borehole log does not match that recorded in the nearby test pit (TE, 2001), so we have modeled the stratigraphy based on our own data. **Foundation elements will extend through the marine terrace cover subsoils to bear on bedrock (see REC 2 and Figure 5).**

The topsoils generally are <2.0 ft thick, soft, black, slightly sandy silt (ML). In general, the silt topsoils are organically rich, have a high consolidation potential and low shear strength, and are unsuitable foundation-bearing soils. We collected no samples, so present no lab data, for this soil horizon.

We collected seven (n = 7) subsoil samples. We summarize the soil properties for each here and in Appendices IA and IC. The lab results of one tested yellowish brown clayey sand (SC) indicate a dry density of 94 pcf. The moisture content of this sample is ~21%. The lab results of four tested gray to yellowish brown silty sand (SM) samples indicate a dry density that ranges between ~101 pcf and ~127 pcf. The moisture content for these samples ranges between ~17% and ~20%. The lab results of two tested gray, poorly graded, silty sand (SP-SM) samples are dry density, ~103 pcf and ~108 pcf, and moisture content, ~16% and ~20%, respectively.

The hand auger borehole was refused on gravel. We infer, based on our inspection of the bluff face, that the gravel is the top of a basal lag gravel lens overlying the abrasion platform on bedrock. The nearby road cutbank / bluff face exposes a gray, poorly graded (with well graded zones), fine to coarse sandy gravel (GP-GW) of variable thickness that ranges between 0.5 ft to 2.0 ft that is perched on fractured and jointed Franciscan Fm bedrock. We intercepted no groundwater within BGC-1 and observed no water percolating from the bluff exposure.

The subsoils have a low consolidation potential, moderate shear strength, low plasticity, low to moderate expansivity potential, and a moderate unconfined compressive strength. Where undisturbed and unsaturated they are competent foundation-bearing soils for a typical single-family residence. If a home were founded on these soils, load-induced and time-dependent settlements would be within tolerances.

In conclusion, the homesite is veneered with ~2 ft of native topsoils overlying ~11 ft of sandy subsoils. Although the subsoils are suitable foundation-bearing soils, the proposal to bear the home on piers anchored to bedrock is prudent to protect against a greater-than-predicted Csz earthquake event (see Figure 5, following discussion, and REC 2).

Quantitative Slope Stability Assessment

Introduction and Description of Our FOS Model

To more thoroughly evaluate the level of risk at the homesite we completed a preliminary quantitative slope stability analysis of the critical profile (Figure 6 and 7). The mathematical analysis, which is called a "Factor of Safety" (FOS) analysis, assesses the stability of a slope by comparing the forces resisting failure to the forces driving failure. In a stable slope, the forces resisting failure exceed the driving forces, so the FOS > 1.0. When the two forces are equal, the FOS = 1.0 and slope failure is imminent. The greater the FOS, the greater the stability of the slope. We used the modified Janbu method, the computer program XSTABL, version 4.0, and a five-layer model subsoil profile [symbols SC, SM, SP-SM, SM, GW] to isolate the initiation of failure planes within the weakly consolidated cover sediments. To model extreme winter conditions we saturated the entire soil profile to the surface, providing a "worst-case" scenario for the site. Our work is "preliminary" because FOS calculations used to design improvements must be done by an engineer registered in California.

The minimum allowable value for the static factor-of-safety (FOS_s) of a slope depends on the following (Duncan and Buchignani, 1975):

(1) The degree of uncertainty in the shear strength measurements, slope geometry, and other conditions;
(2) The cost of flattening or lowering the slope to make it more stable;
(3) The cost and consequence of a slope failure; and
(4) Whether the slope is temporary (e.g., a construction cutbank) or permanent.

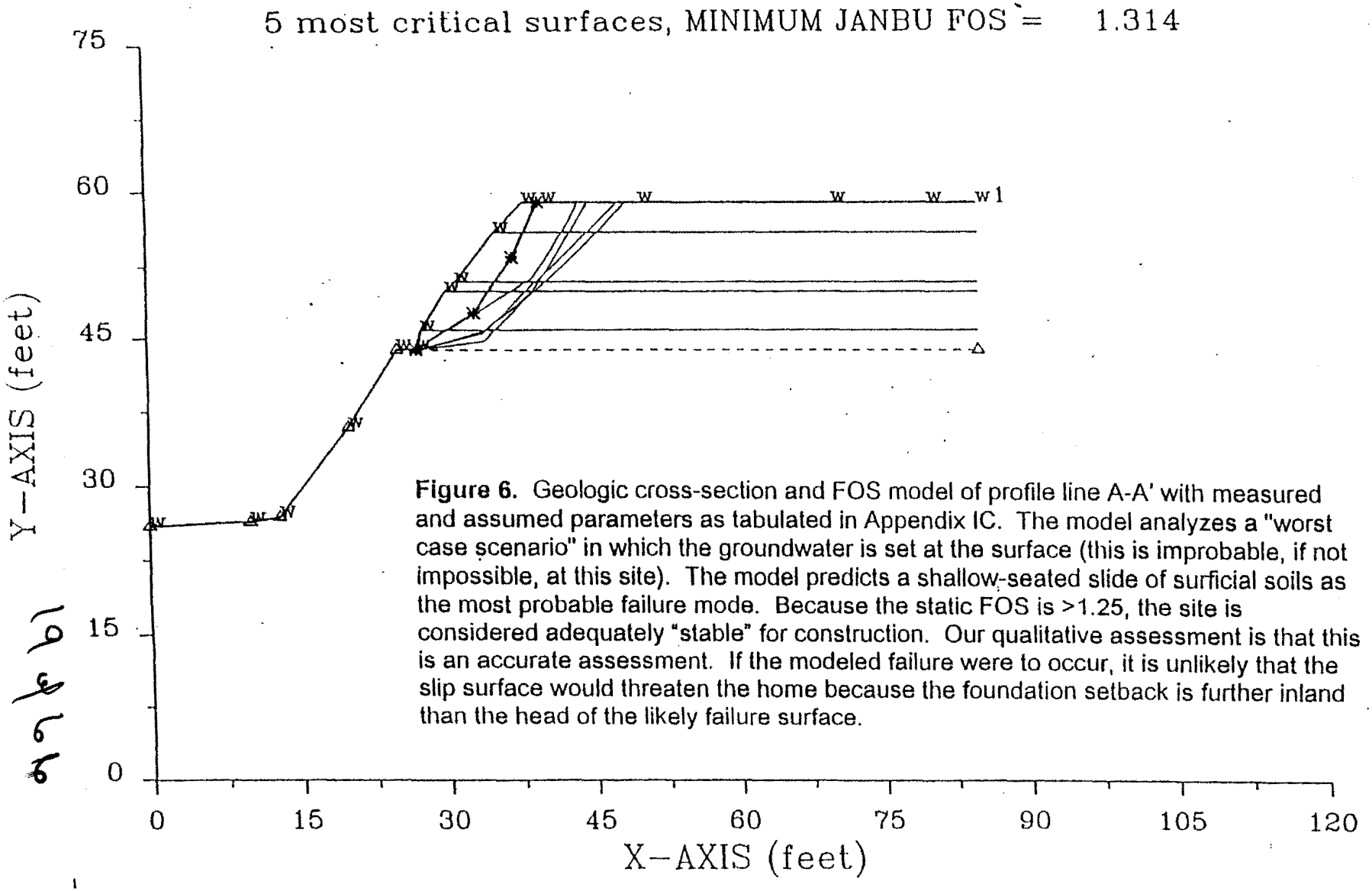


Figure 6. Geologic cross-section and FOS model of profile line A-A' with measured and assumed parameters as tabulated in Appendix IC. The model analyzes a "worst case scenario" in which the groundwater is set at the surface (this is improbable, if not impossible, at this site). The model predicts a shallow-seated slide of surficial soils as the most probable failure mode. Because the static FOS is >1.25, the site is considered adequately "stable" for construction. Our qualitative assessment is that this is an accurate assessment. If the modeled failure were to occur, it is unlikely that the slip surface would threaten the home because the foundation setback is further inland than the head of the likely failure surface.

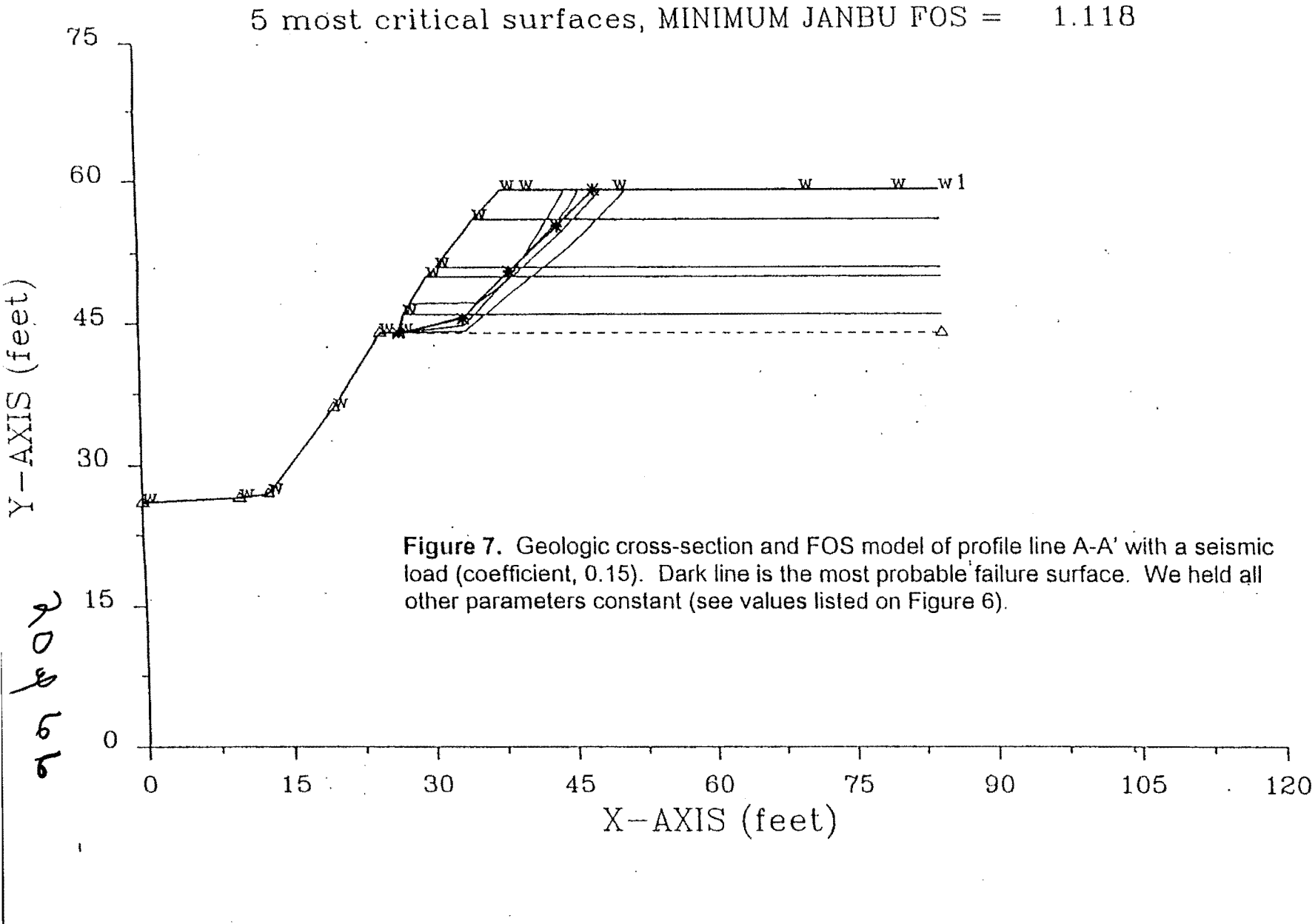


Figure 7. Geologic cross-section and FOS model of profile line A-A' with a seismic load (coefficient, 0.15). Dark line is the most probable failure surface. We held all other parameters constant (see values listed on Figure 6).

Typical practice is to recommend that the minimum static stability of an area of concern be FOS_s = 1.2 (Fang and Mikroudis, 1991) to 1.25 (Duncan and Buchignani, 1975), or greater (ibid., Huang, 1983). The better the soil stratigraphy and strength data are known, the lower the FOS_s can be because there is greater certainty in the analysis. For our analysis we used both measured and assumed values for soil strength parameters, but most were measured.

Conclusions from Preliminary FOS Analysis

Figures 6 and 7 graphically present the results of our preliminary FOS analysis of the critical profile using the slope geometry, stratigraphy, and water table shown on the figures. The soil parameters we used are listed in Appendix IC. We do not show or discuss constraints (such as failure segment length) that we input into the program. Each figure illustrates the five most probable failure surfaces for the conditions evaluated. The failure surface with asterisks is the surface with the lowest factor of safety, which is stated on the figure. Figure 6 models static conditions with the point of origin (toe) of the landslide forced between x = 27 and 38 feet (from the arbitrary point of origin). Figure 7 models dynamic conditions (earthquake shaking conditions) with the seismic coefficient, k, equal to 0.15; the model uses the same soil parameters as Figure 6.

In conclusion, a consideration of the observed site conditions and the results of our preliminary FOS analysis suggests that:

1, the most probable slope failure mode is shallow landsliding of weathered surficial soils on the face of the bluff (see Figure 6);
2, on the critical profile, FOS_s = 1.31 and the failure sole intersects the ground surface ~2 feet east of the break-in-slope, well west of the house footprint; and
3, on the profile line, FOS_d = 1.11, extending ~10 ft east of the break-in-slope, which would lie within the house footprint (Figure 7).

In plain English, these results suggest that under the most extreme static condition imaginable (the groundwater table at the surface), a static slope failure would not extend into the home footprint. Because the modeled groundwater level cannot occur at the site, the FOS_s is conservative (low). The model condition cannot occur because the subsoils are mostly well drained sands overlying high permeability gravels. Although a long duration, intense rain might cause a groundwater table to form in the

basal few feet of the marine terrace sediments, our FOS analysis suggests that it is unlikely that the slope will fail in response to temporarily elevated water levels.

Of greater relevance is the issue of improperly drained surface water runoff over the edge of the terrace. The small slide scarp along the bluff edge (Figure 4) is indicative of a failure caused by misdirected runoff across an over-steepened road cutbank (see REC 5).

Summary of Site-Specific Geologic Hazards and Risks

In its present condition, the bluff-top homesite has a LOW risk of slope failure under static ("everyday") conditions. The risk that the homesite will landslide under the dynamic conditions of a strong seismic event, e.g., during a Cascadia subduction zone earthquake of M_w 8.0+, as modeled for the Crescent City area, or in response to especially adverse but temporary groundwater conditions (saturated soils under high pore water pressures), also is LOW. These levels of risk are regionally typical and are acceptable to a prudent person of average economic means (see Appendix IV). Future grading below the site could increase or decrease this level of risk.

The high risk associated with the seismic shaking hazard (a regional geologic hazard) cannot be mitigated. **The risk associated with this hazard is regionally typical in the Crescent City area and is routinely assumed by local residents.**

Existing site-specific hazards and (in parentheses) associated risks of foundation damage exceeding conventional tolerances at the homesite, if the home is built on a conventional shallow foundation with the bluff-top setback shown on Figure 4 and the hazard goes unmitigated--are:

- static landsliding (risk LOW);
- dynamic landsliding (risk LOW);
- settlement and differential settlement of topsoils (risk, HIGH);
- creep of uppermost (top 2 feet) of subsoils on slopes >15% (risk HIGH);
- creep of deeper native subsoils (risk LOW); and
- soil erosion on bluff face (risk HIGH where bare due to deflation, raindrop impact, and raveling; marine erosion rate zero; overall erosion rate <1/2 in/yr [estimate]).

Our geotechnical recommendations address these hazards and risks.

RECOMMENDATIONS

Currently the home design is incomplete. However, the owners have made decisions about the general development plan, as discussed in TE (2001). Specifically, they plan to support the home on a reinforced pier and grade beam foundation resting on bedrock (see Figure 5). This decision is prudent because a deep foundation system will be exposed to the lowest risk of damage due to possible soil hazards and bluff failure. Our recommendations address the current development plan only. **Adherence to our recommendations will reduce--but not necessarily eliminate--risks associated with the identified site-specific soils hazards.**

REC 1. Have an engineer registered in California design a deep foundation that complies with our recommendations. The foundation should be constructed of reinforced concrete piers and grade beams. The engineer may use end-bearing or combination end-bearing and friction piers.

REC 2. Extend the drilled-and-poured piers at least eighteen (18) inches into the bedrock (see REC 6 for the construction of slabs and see REC 8 for a construction monitoring requirement). The project engineer may require a deeper embedment.

That is, dig the excavations for the grade beams, then drill boreholes within these excavations as shown on the engineered drawings (to be prepared). Extend the boreholes through all topsoils and subsoils a minimum of eighteen inches into the target bedrock. Clean the drilling spoils from the grade beam excavations, then place a rebar cage into each borehole and grade beam excavation and tie them together as specified on the engineer's drawings. Do a monolithic pour using the concrete specifications of the engineer.

Because of the low density topsoils at the proposed homesite, we recommend that interior floors be supported by the pier and grade beam foundation. It is acceptable for habitable slabs to rest on the ground (see **REC 6**).

REC 3. Design to UBC Seismic Zone 4 guidelines or better. Although the Uniform Building Code (UBC) places the site in Seismic Zone 3, we recommend you structurally upgrade the home to UBC Seismic Zone 4 guidelines. Our recommendation is based on the presence of Seismic Zone 4 areas nearby to the north and south. For additional information, contact us.

Assuming Seismic Zone 4 guidelines are used, the Seismic Zone Factor, Z, is 0.40.

The nearby Big Lagoon-Bald Mountain fault is a Type B fault (per 1997 UBC Table 16-U, Petersen et al., 1996). At its closest, the trace is about 9.6 mi (~6 km) west of the site. Assuming a 35° dip of the fault plane to the east, the site is located above the fault plane. Using the Big Lagoon-Bald Mountain fault as the "controlling fault," and 1997 UBC tables as appropriate, the applicable Near-Source Factors are:

Acceleration, N_a = 1.0 (Table 16-S), and
Velocity, N_v = 1.2 (Table 16-T).

The Soil Profile Type, assuming the subsurface conditions, is S_B (per Table 16-J and Section 1636).

The Seismic Coefficients C_a and C_v are:
Acceleration, $C_a = 0.44N_a$ (Table 16-Q), and
Velocity, $C_v = 0.64N_v$ (Table 16-R).

REC 4. Use UBC presumptive allowable foundation pressures. Use the presumptive bearing values for sedimentary rock (2000 psf), plus allowances, given in the current edition of the Uniform Building Code (ICBO, 1997, Table 18-I-A). If higher bearing pressures are desired and you need additional information, please contact us.

REC 5. Use short-term and long-term erosion-control measures. To effect short-term erosion control, seed all slopes bared during construction as soon as possible (other than the driveways and any temporary fill storage piles), and install and maintain any short-term erosion-control structures that are necessary.

To achieve long-term results, permanently control roof and other residential runoff so that it does not concentrate and spill over the edge-of-bluff. A variety of alternative standard biologic and structural solutions are available and are known to architects, engineers, and contractors.

REC 6. Use a moisture break and vapor barrier beneath any slab in a habitable area. To reduce the potential for interior water damage, construct a moisture break and vapor barrier beneath each slab-on-grade in a habitable area, as follows: Place 4 to 6 inches of "river-run" (sand and gravel less than 3" in diameter) or Class 2 aggregate base compacted to 95% of ASTM 1557-78 on a prepared subgrade. Place

a plastic sheet on top of the compacted material and place 1 to 2 inches of clean sand on top of that. Carefully lap and tape all seams and utility pipe openings. Avoid puncturing the sheet during construction. **The slab may rest on the ground, rather than on grade beams, but the topsoil layer should be removed and replaced to design bottom-of-slab grade with a compacted river-run or crushed aggregate base rock.** If you desire fill or compaction specifications, please contact us.

REC 7. **If the house plan were to change to include a "daylight basement," appropriately slope all temporary cutbanks made for the basement retaining walls to reduce the risk of a cutbank failure during construction.** If the ground is moist to wet during construction, use extreme caution when making the temporary cuts for any retaining walls. Initially, slope the cutbanks at a 1:1 slope. If they begin to fail, contact us immediately and/or flatten the slopes to 1.5:1 (H:V). If soils are damp to dry during construction, they probably will hold a 1:1.5 (H:V) face long enough to complete the work. **Place a back-drain behind all retaining walls and a subfoundation drainage blanket beneath the basement floor.**

REC 8. **Have the project engineer or engineering geologist monitor the drilling of the pier borings to verify that dense sandstone is the bedrock at each hole, and to record the completion depth.** Have the inspector, or the earthworks contractor drilling the boreholes (if the inspector does not monitor the construction of all of the boreholes), write the as-built completion depth of each borehole on the construction site plans. The inspector should prepare a certification letter for distribution to the City and/or County, as appropriate.

REC 9. **Retain a copy of this report and the certification letter require by REC 8.** Keep them on file with your deed for use in possible future realty transactions.

CLOSURE and AUTHENTICATION

Our conclusions and recommendations are based on the results of a site-specific geotechnical investigation. The report provides recommendations that, if followed, will lower—but not entirely eliminate—levels of risk associated with identified site-specific geologic and soils hazards. Although a low risk of landsliding exists at the property, inappropriate grading activities could increase this level of risk.

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Although we believe our report accurately characterizes site soils and conditions in the building area, and that it anticipates adverse conditions as they might affect risks, the region is subject to great storms and earthquakes and we therefore cannot preclude the possibility of a catastrophe. By necessity, the current and all future owners of this property must assume the risks associated with any "act of God" and hold harmless their realtors, professional consultants, contractors, and involved regulatory agencies.

We are available to provide a conformance inspection (REC 9) or any other geotechnical support services you desire. If you or your project architect, engineer, or contractor have any questions, please call. Thank you again for hiring us.

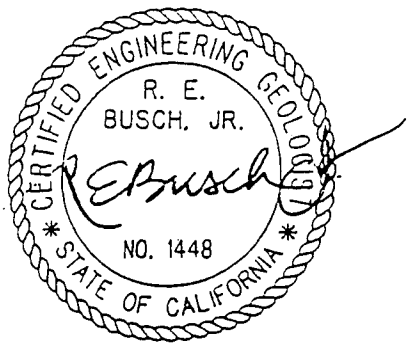
Respectfully submitted,

Busch Geotechnical Consultants

Unavailable for signature

Ronna Bowers
Project Geologist

Steve Bacon
Staff Engineering Geologist



R. E. Busch, Jr., Ph.D.
C.E.G. #1448

SNB/REB: azb2+
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Attachments: References Cited, List of Appendices, Appendices

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LIST OF APPENDICES

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APPENDIX IA.

SOIL LOG

BUSCH GEOTECHNICAL CONSULTANTS

Job: Kraft

Job #: 01-090 By: SDT/SNB

Log #: BGC-1

Date: 11/15/01

Equipment: Hand Auger

Page: 1 of 2

Laboratory Data						
Uc (tsf)	shear strength (psf)	Water (%)	dry density (pcf)	sample	depth in feet	Unified Soil Classification texture, consistency, moisture, color, symbol
					-	Topsoil:
					-	Silt, sandy (fine), soft, moist, black, (ML).
					-	
					1	
					-	
					-	
					-	
					2	
					-	Sand (fine), clayey, silty, medium dense, moist, yellowish brown,
					-	[SC]; resembles pedogenic B(t) horizon.
3.3	1100	20.7	94.0	Tube	-	
					3	
					-	Sand (fine), slightly clayey, silty, medium dense, moist,
					-	yellowish brown, [ML]; resembles pedogenic B(t) horizon.
					-	
					4	
N/A	N/A	19.6	101.2	Tube	-	Sand (fine to coarse), silty, medium dense, damp,
					-	yellowish brown, [SM]; contains MnO_2 oxidation, resembles
4.5	700	17.1	102.0	Tube	-	pedogenic C(ox) horizon.
					5	
					-	
					-	
					-	
					6	
					-	
					-	
					-	Sand (fine to coarse), silty, medium dense, moist, gray,
					7	[SP-SM]; gray color suggests reduced conditions.
					-	
					-	
					-	
					8	
3.25	400	20.3	108.2	Tube	-	Sand (fine), silty, medium dense, moist, gray, [SP-SM];
					-	contains sparse well-rounded, fine to coarse gravel.
N/A	N/A	15.9	103.5	Tube	-	
					9	
					-	
					-	
1.5	500	17.3	127.1	Tube	-	Sand (fine), silty, loose, wet, gray, [SM]; contains sparse
					10	well-rounded, fine to coarse gravels.
					-	

Notes: Uc (unconfined compressive strength) measured by penetrometer
"Quick" shear strength measured by torvane

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SOIL LOG

BUSCH GEOTECHNICAL CONSULTANTS

Job: Kraft
Equipment: Hand Auger

Job #: 01-090 **By:** SDT/SNB

Log #: BGC-1
Date: 11/15/01
Page: 2 of 2

Laboratory Data						Unified Soil Classification
Uc (tsf)	shear strength (psf)	Water (%)	dry density (pcf)	sample	depth in feet	texture, consistency, moisture, color, symbol
N/A	N/A	20.2	118.4	Tube	-	continue
					-	sample disturbed; slid through tube
					-	
					11	Refusal on gravel
					-	
					-	Bluff exposure:
					-	Gravel (fine to coarse), sandy (coarse), medium dense, moist,
					12	gray, [GW]; well-rounded gravel perched atop bedrock.
					-	
					-	
					-	
					13	
					-	Bedrock:
					-	Franciscan Formation.
					-	
					14	
					-	
					-	
					-	
					15	
					-	
					-	
					-	
					16	
					-	
					-	
					-	
					17	
					-	
					-	
					-	
					18	
					-	
					-	
					-	
					19	
					-	
					-	
					-	
					20	
					-	

Notes: Uc (unconfined compressive strength) measured by penetrometer
"Quick" shear strength measured by torvane

APPENDIX IB

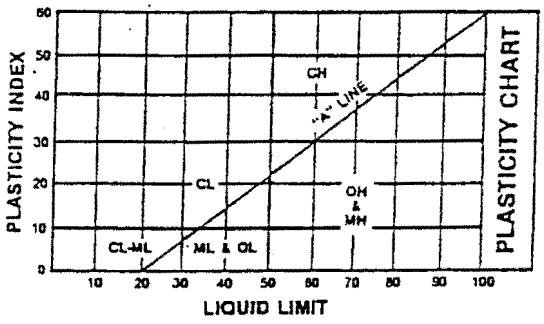
UNIFIED SOILS CLASSIFICATION SYSTEM

	MAJOR DIVISIONS	SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS (More than ½ of soil > no. 200 sieve size)	GRAVELS (More than ½ of coarse fraction > no. 4 sieve size)	GW	Well graded gravels or gravel-sand mixtures, little or no fines.
		GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GM	Silty gravels, gravel-sand-silt mixtures.
		GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than ½ of coarse fraction < no. 4 sieve size)	SW	Well graded sands or gravelly sands, little or no fines.
		SP	Poorly graded sands or gravelly sands, little or no fines.
		SM	Silty sands, sand-silt mixtures.
		SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than ½ of soil < no. 200 sieve size)	SILTS & CLAYS Liquid limit less than 50	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
		OL	Organic silts and organic silty clays of low plasticity.
	SILTS & CLAYS Liquid limit greater than 50	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
		CH	Inorganic clays of high plasticity, fat clays.
		OH	Organic clays of medium to high plasticity, organic silty clays, organic silts.
	HIGHLY ORGANIC SOILS	PT	Peat and other highly organic soils.

CLASSIFICATION CHART

CLASSIFICATION	U.S. STANDARD SIEVE SIZE
BOULDERS	Above 12"
COBBLES	12" to 3"
GRAVEL	3" to No. 4 sieve
Coarse	3" to ¼"
Fine	¼" to No. 4
SAND	No. 4 to No. 200
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
SILT & CLAY	Below No. 200 sieve

GRAIN SIZE CHART



PLASTICITY CHART

MOISTURE CONTENT (VISUAL CLASSIFICATION)
Dry – Damp – Moist – Wet

CONSISTENCY OF FINE GRAINED SOILS		DENSITY OF COARSE GRAINED SOILS	
CLASSIFICATION	COHESION (PSF)	CLASSIFICATION	STANDARD PENETRATION (BLOW COUNT)
Very Soft	0-250	Very Loose	0-4
Soft	250-500	Loose	4-10
Medium Stiff	500-1000	Medium	10-30
Stiff	1000-2000	Dense	30-50
Very Stiff	2000-4000	Very Dense	50+
Hard	4000+		

DENSITY - CONSISTENCY

APPENDIX IC.

Summary of Kraft Lab Data

Sample	Sample Depth (ft)	Material Type (USCS)	Moisture Content (%)	Dry Density (pcf)	Void Ratio (e)	"Quick" Shear Strength (tsf)	Unconfined Compressive Strength (tsf)
BGC-1	2.5	SC	20.7	94	0.8	1100	3.25
BGC-1	4.0	SM	19.6	101.2	0.6	DS*	DS*
BGC-1	4.5	SM	17.1	102	0.6	700	4.5
BGC-1	8.0	SP-SM	20.3	108.2	0.5	400	3.25
BGC-1	8.5	SP-SM	15.9	103.5	0.6	DS*	DS*
BGC-1	9.5	SM	17.3	127.1	0.3	500	1.5
BGC-1	10.0	SM	20.2	118.4	0.4	N/A	N/A

* Direct shear test performed on soil sample (Appendix ID).

Summary of Parameters used in Factor of Safety Analysis

GEOLOGIC UNIT	SOIL TYPE/ LAYER #	γ_d (pcf)	γ_m (pcf)	c* (psf)	f (degrees)
Qpm2	SC (1)	94•	114•	150	30
	SM (2)	102•	121•	135	34•
	SP-SM (3)	106•	125•	94	31•
	SM (4)	123•	146•	94	31
	GW-GP (5)	130	140	50	36
KJf	FRANCISCAN BEDROCK **modeled as a restrictive layer (i.e., no parameters required)**				

γ_d = dry density
γ_m = moist (field) density
f = internal angle of friction
*c = cohesion; all value set at 0.1 of measured value due to cementation.

• = parameters measured and/or averaged from measured values;
all other values (w/out black dot) are assumed parameters as per Hunt (1984).

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APPENDIX ID.

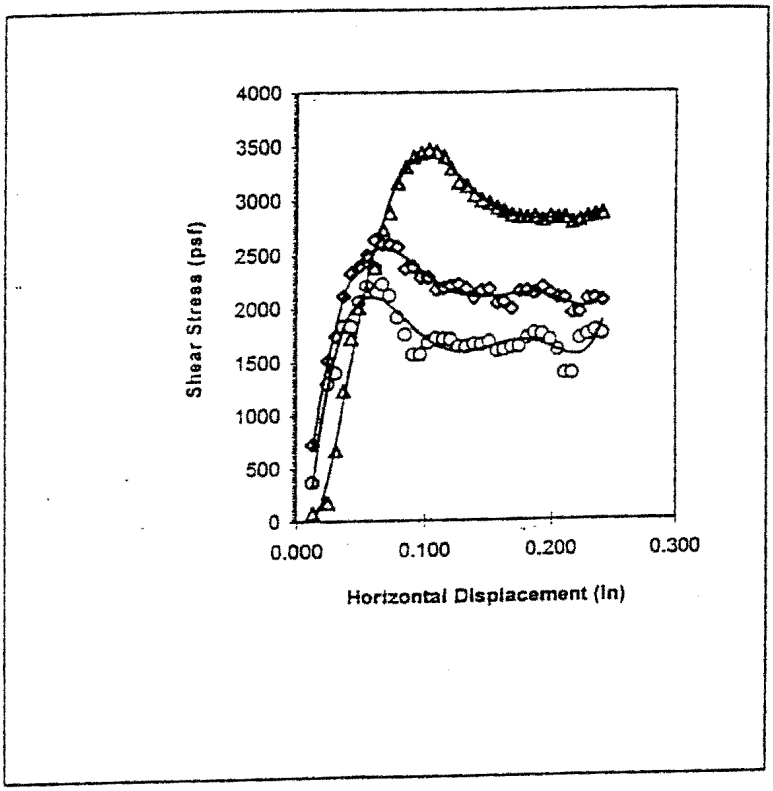
BUSCH GEOTECHNICAL CONSULTANTS
DIRECT SHEAR RESULTS

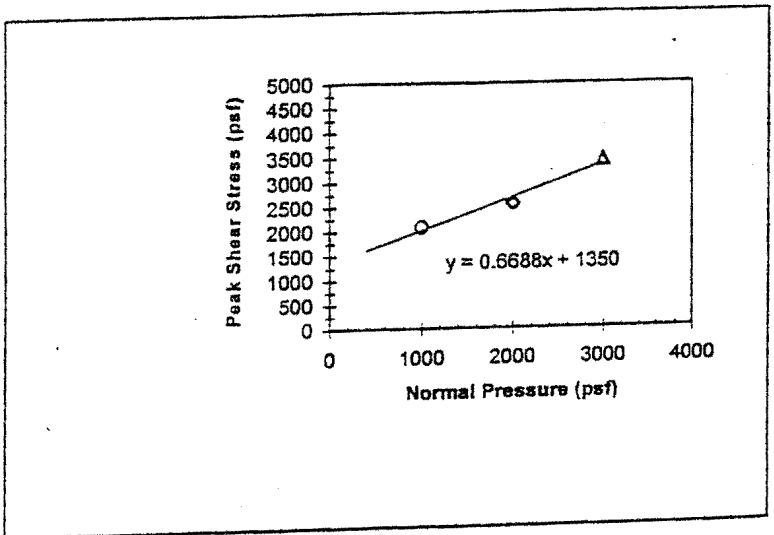
Job Name: Kraft
Job Number: 01-090

Sample # BGC-1 (4.0-4.5')
Description: SM

Date: 11/20/01
By: RJB

horiz displ. (inches)	Normal Pressure 1000 SHEAR STRESS	2000	3000	Time min
0.012	364	725	75	0.50
0.024	1292	1515	174	**1.00**
0.030	1397	1741	666	1.25
0.036	1826	2115	1230	1.50
0.042	1826	2321	1718	1.75
0.048	2056	2387	2003	**2.00**
0.054	2207	2492	2157	2.25
0.060	2374	2636	2377	2.50
0.066	2220	2590	2734	2.75
0.072	2111	2590	2889	**3.00**
0.078	1908	2567	3164	3.25
0.084	1748	2364	3311	3.50
0.090	1561	2380	3400	3.75
0.096	1564	2282	3439	**4.00**
0.102	1675	2282	3469	4.25
0.108	1711	2167	3449	4.50
0.114	1705	2184	3400	4.75
0.121	1698	2207	3292	**5.00**
0.127	1633	2223	3167	5.25
0.133	1636	2180	3134	5.50
0.139	1656	2092	3049	5.75
0.145	1652	2164	3000	**6.00**
0.151	1685	2174	2967	6.25
0.157	1593	2043	2928	6.50
0.163	1603	2056	2898	6.75
0.169	1626	1987	2862	**7.00**
0.175	1633	2148	2843	7.25
0.181	1711	2157	2836	7.50
0.187	1761	2134	2843	7.75
0.193	1751	2190	2816	**8.00**
0.199	1695	2131	2849	8.25
0.205	1600	2089	2830	8.50
0.211	1377	2085	2836	8.75
0.217	1377	1948	2790	**9.00**
0.223	1705	1954	2816	9.25
0.229	1744	2075	2846	9.50
0.235	1780	2082	2859	9.75
0.241	1751	2059	2875	**10.00**





phi = 34 **degrees**
cohesion = 1350 **psf**

diameter	2.365	inches
height	1.5	inches
strain rate	1.0	percent/min.
water content	19.6	percent
dry density	101.2	pcf

Note: Sample contains zones of MnO_2 oxidation.

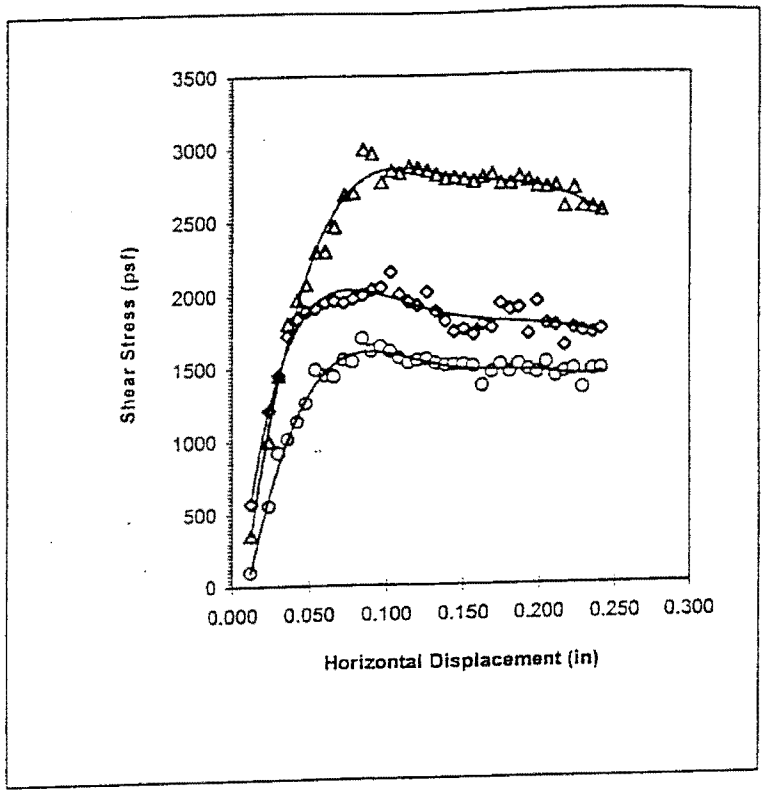
BUSCH GEOTECHNICAL CONSULTANTS
DIRECT SHEAR RESULTS

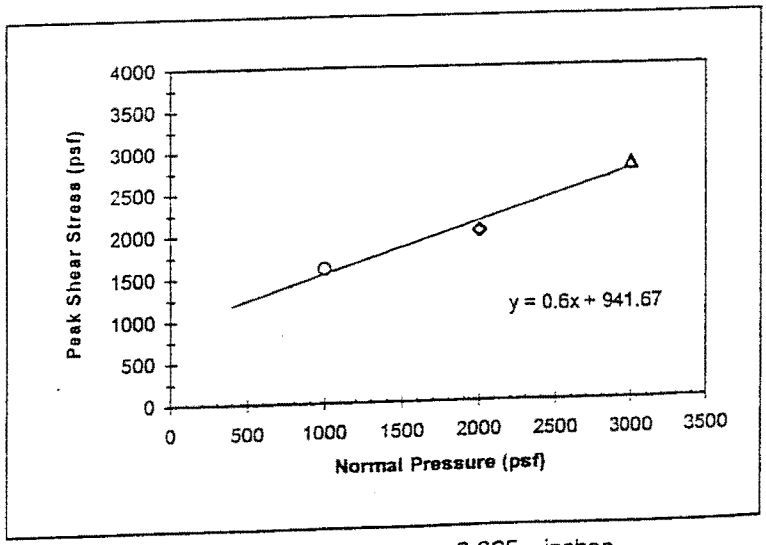
Job Name: Kraft
Job Number: 01-090

Sample # BGC-1 (8.5-9.0')
Description: SP-SM

Date: 11/20/01
By: RJB

horiz displ. (inches)	Normal Pressure 1000 SHEAR STRESS	2000	3000	Time min
0.012	98	577	354	0.50
0.024	557	1216	1007	1.00
0.030	921	1459	1459	1.25
0.036	1020	1725	1810	1.50
0.042	1138	1839	1974	1.75
0.048	1266	1889	2075	2.00
0.054	1495	1911	2292	2.25
0.060	1452	1951	2298	2.50
0.066	1446	1964	2462	2.75
0.072	1561	1951	2682	3.00
0.078	1544	1977	2695	3.25
0.084	1705	2000	2993	3.50
0.090	1616	2033	2964	3.75
0.096	1646	2049	2767	4.00
0.102	1610	2151	2846	4.25
0.108	1567	2003	2826	4.50
0.114	1531	1951	2872	4.75
0.121	1551	1921	2859	5.00
0.127	1557	2016	2839	5.25
0.133	1528	1885	2816	5.50
0.139	1515	1816	2787	5.75
0.145	1518	1744	2797	6.00
0.151	1521	1767	2784	6.25
0.157	1505	1725	2767	6.50
0.163	1374	1797	2797	6.75
0.169	1469	1770	2816	7.00
0.175	1521	1938	2754	7.25
0.181	1469	1892	2754	7.50
0.187	1521	1905	2797	7.75
0.193	1479	1725	2770	8.00
0.199	1459	1948	2731	8.25
0.205	1528	1793	2721	8.50
0.211	1430	1780	2731	8.75
0.217	1462	1643	2590	9.00
0.223	1479	1761	2715	9.25
0.229	1348	1741	2590	9.50
0.235	1475	1728	2584	9.75
0.241	1482	1754	2561	10.00





phi = 31 **degrees**
cohesion = 942 **psf**

diameter	2.365	inches
height	1.5	inches
strain rate	1.0	percent/min.
water content	15.9	percent
dry density	103.5	pcf

Note: Sample contains few fine-grained pebbles.

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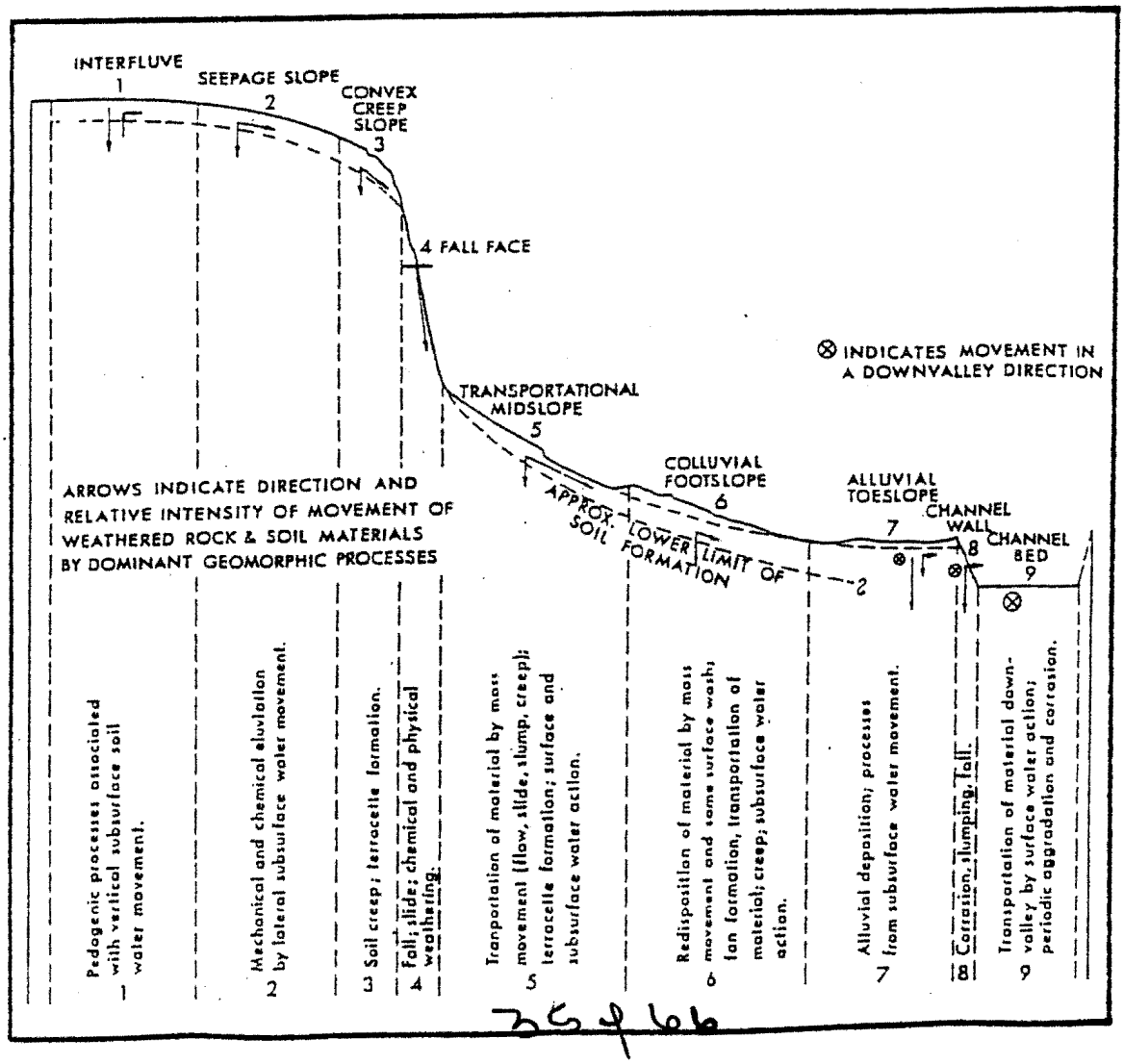
APPENDIX II

SLOPE-STEEPNESS CATEGORIES
(Kelsey, 1976, as modified by Busch, 1981, 1983, 1986)

Negligible	= 0 - 2.9°	(0 - 5.0%)
Gentle	= 3 - 4.9°	(5.1 - 8.5%)
Low-Moderate	= 5 - 9.9°	(8.6 - 17.5%)
Moderate	= 10 - 19.9°	(17.6 - 36%)
High-Moderate	= 20 - 30.9°	(36.1 - 60%)
Steep	= 31 - 44.9°	(60.1 - 99%)
Precipitous	= 45° and over	(>100%)

LANDFORM CLASSIFICATION
(from Dalrymple and others, 1968)

Diagrammatic representation of a hypothetical nine-unit land-surface model.



APPENDIX III

BGC's QUALITATIVE SLOPE-STABILITY CLASSIFICATION
(Young, 1978, modified by Busch, 1980b)

VS - Very Stable (NEGLIGIBLE risk):
negligible and gently sloping interfluves, seepage slopes, and some convex creep slopes (e.g., ridge crests and knolls) underlain by intrinsically strong rocks; flat and gently rolling terraces away from the edges.

S - Stable (NEGLIGIBLE to VERY LOW risk):
slightly less stable areas of the same land-forms as in VS; gentle to low-moderate slopes of strong rocks.

MS - Moderately Stable (LOW to MODERATE risk):
gentle to low-moderate slopes of soft topographies (e.g., ridge edges, noses, and upper flanks); high-moderate slopes on most intermediate and hard topographies (e.g., some convex creep slopes and transportational midslopes).

PS - Provisionally Stable (MODERATE to HIGH risk):
moderate and high-moderate slopes in soft topographies (e.g., transportational midslopes, usually with relic mass-movement landforms) and steep slopes on hard topographies.

U - Unstable (HIGH risk):
temporarily inactive or slightly active sites of chronic mass wasting (e.g., earthflows, complex slump-earthflows, slumps, slopes with many soil slip scars, failing terrace edges).

VU - Very Unstable (HIGH to VERY HIGH risk):
extremely steep areas of soft topography and actively failing mass-wasting sites.

These categories qualitatively evaluate the intrinsic slope stability of a landscape. They take into account various structural, topographic, stratigraphic, geologic, hydrologic, and vegetative influences on stability. The categories necessarily are subjective, and naturally are gradational. Developmental activities subsequent to classification can detrimentally affect stability and can correspondingly increase levels of risk.

APPENDIX IV

EXPLANATION OF RISK ZONES

(Paraphrased from Moore & Taber, 1978; standardized with BGC's slope-stability classification)

The level of risk associated with a geologic hazard that potentially could cause a loss is described in terms of risk classes ranked in the following ascending scale:

NONE, NEGLIGIBLE, LOW, MODERATE, HIGH, VERY HIGH

The risk or probability of loss due to an action of a recognized geologic hazard is directly related to the level of risk associated with the hazard and to the nature of the potentially affected facility. A "reasonable risk" is defined as a probability of significant loss that is low enough to be acceptable to a prudent person (owner) of average economic means.

The nature, cost, and projected economic lifespan of an improvement, the economic means of the owner, the type and level of site maintenance, the feasibility of making potentially necessary repairs, public policy, etc., are factors that collectively established an acceptable (a "reasonable") level of risk. The definition of "reasonable risk" for a present owner/user must be compatible with "reasonable risk" for projectable successor owners and/or users.

For fixed improvements susceptible to permanent damaging effects of ground movement—such as a typical single family residence, a "reasonable level of risk" for a prudent person of average economic means generally is considered to be NEGLIGIBLE or LOW. For similar improvements, a MODERATE risk level generally is a level of risk that exceeds "a reasonable level of risk" with respect to loss of property, not of life. However, this level of risk sometimes may be acceptable to a prudent person of above-average economic means. HIGH and VERY HIGH levels of risk almost always pose a level of risk that exceeds a "reasonable risk" and would be unacceptable to any prudent person for such improvements.

For improvements of low cost that are readily amenable to repair or are not susceptible to the damaging affects of ground movement, or for land uses that might not be affected seriously by ground movement (i.e., some roads, picnic areas, or campgrounds, etc.), a MODERATE or HIGH level of risk may be considered to be a "reasonable risk."

Appendix V.
Tectonic and Seismic Setting of Humboldt County

The Humboldt County region contains numerous tectonic structures capable of generating strong ground motion. Chief among these are: 1) internal faults within the oceanic Gorda plate; 2) the Mendocino fault (the boundary between the Gorda and Pacific plates); 3) the megathrust of the Cascadia subduction zone (Csz); 4) faults within the Mad River fault zone [MRfz] and Little Salmon fault system [LSfs] in the North America plate; and 5) the San Andreas fault system. Table 1 summarizes the active and potentially active significant Quaternary faults and fault zones within about 100 km of Eureka. The table does not list all known capable faults. The accompanying figures illustrate the regional tectonic setting and historic regional seismicity.

1) Intraplate faults in the Gorda plate are the most probable source of a significant regional earthquake. During the period 1974-1984 over 80% of the earthquakes recorded by the Humboldt Bay Seismic Network were Gorda plate events (McPherson, 1989). Most of the Gorda Plate is deforming along NW-trending right-lateral, and NE-trending left-lateral, faults. Gorda plate events probably have a maximum magnitude of about M 7.5 (Dengler et al., 1992).

2) The Mendocino fault is the east-west-trending southern boundary of the Gorda plate. It is a right-lateral strike slip fault for most of its length, but exhibits thrust mechanisms in its eastern margin (McPherson, 1989). Historically the Mendocino fault has been a major source of the seismicity of the region. The fault could produce a M 7.25 to M 8.0 earthquake (WCC, 1989).

3) The Cascadia subduction zone (Csz) is the convergent boundary between the underthrust Gorda plate and the overthrust North American accretionary margin. Csz folds and thrusts are expressed offshore by the topography of the sea floor. Deep seismic reflection profiles indicate that the faults displace Pleistocene sediments (Clarke and Carver, 1992; Clarke, 1992). Onshore, faulted and folded late Quaternary sediments, plus buried estuarine marshes, indicate that large subduction zone earthquakes occurred in the Humboldt Bay area during the Holocene (Clarke and Carver, 1992). An evaluation of the seismic hazard of the southern end of the Csz suggests that past Csz events have been on the order of magnitude 8.5 or higher (Clarke and Carver, 1992).

4) Onland, the MRfz consists of a series of imbricate, NW-trending, NE-dipping thrust faults encompassing the area between Big Lagoon on the north and Arcata on the south. The faults extend inland to about Maple Creek (Carver, 1987; Carver et al., 1982, 1983, 1985), and can be traced in the offshore (Clarke, 1992). Along the coast, the faults of the MRfz have offset the flat to subdued topography of numerous late Pleistocene marine and fluvial terraces (Carver and Burke, 1987a, b; Carver, 1987).

5) The San Andreas fault system in coastal northern California consists of numerous subparallel faults distributed across a broad region about 100 km (62 mi) wide (Castillo and Ellsworth, 1992). The system includes the offshore trace of the San Andreas fault--a right-lateral strike slip fault, and a number of subparallel, high-angle, northwest-trending faults including the Garberville, Lake Mountain, Maacama, Bartlett Springs, and Eaton Roughs faults. The northern segment of the San Andreas fault is capable of generating a magnitude 8+ earthquake (the 1906 San Francisco earthquake on this segment registered 8.3 M). Inland San Andreas system faults (e.g., the Maacama) can generate up to about a 7.1 M earthquake (Petersen et al., 1996).

Maximum Probable and Maximum Credible Earthquakes and Accelerations

The Maximum Probable Earthquake (MPE) is the earthquake that has a 1% probability of occurring each year. For most projects this is the "design earthquake." The Maximum Credible Earthquake (MCE) is the largest possible earthquake that could strike a site.

Although the Gorda plate has generated a 7.5 M earthquake (Dengler et al., 1992), the MPE for Eureka is a 7.0 to 7.3 M event (Kilbourne et al., 1980) occurring in the southern Gorda plate or on the Mendocino fault. Statistically, the MPE occurs about every 22 years in the Gorda plate (WCC, 1980), although since 1980 the Humboldt Bay area has been shaken by three earthquakes over 7.0 M (Dengler et al., 1992). Assuming a 50-year design life, one or more MPEs are likely to occur during the lifespan of a project (the risk is HIGH).

The MCE for the Humboldt Bay region is an 8.5 M or larger earthquake generated by a rupture of the Cascadia megathrust (the interface between the North America plate and the subducting Gorda plate) (Clarke and Carver, 1992). If the southern segment alone ruptures (Cape Mendocino to about Oregon border), the event theoretically would be about 8.5 M_w (Clarke and Carver, 1992). If the entire length of the megathrust ruptured, the magnitude could be comparable to that of the 1964 Alaskan earthquake [M_w 9.2] or the 1960 Chilean earthquake [about M_w 9.6] (Dengler et al., 1992). Both of these earthquakes were great subduction zone earthquakes (Plafker, 1972). During a Csz earthquake, Modified Mercalli Intensities along the coast most likely would exceed MMI X, and they could approach MMI XII.

The probability of the MCE is poorly constrained. The recurrence interval for Csz events is about 300 to 560 years (Clarke and Carver, 1992), and about 300 years has elapsed since the last MCE in Humboldt County (Carver and Burke, 1987a, b). Elsewhere along the Pacific Northwest coast, about the same length of time has elapsed since the last Csz event, suggesting that either a single great earthquake occurred, or large events occurred penecontemporaneously (Peterson et al., 1992). The probability of occurrence of a Gorda segment Csz event is unknown but is sufficient to justify preparedness planning (Toppozada et al., 1995).

Work by Woodward-Clyde Consultants for Humboldt State University (WCC, 1989) concludes that for a 50-year project design life in Arcata there is a 50% probability that an acceleration of 0.33 g will be exceeded, a 25% probability that an acceleration of 0.47 g will be exceeded, and a 10% probability that an acceleration of 0.67 g will be exceeded. These accelerations are peak horizontal rock accelerations and do not take into account possible site amplification.

Attached: Table: Active and Potentially Active Quaternary Faults (p 4.)
Appendix V References Cited (pp. 5, 6)
Figure VII-1. Tectonic Map of Northern California (p. 7)
Figure VII-2. Quaternary Faults of Coastal Humboldt County (p. 8)
Figure VII-3. Seismic Setting (p. 9)
Figure VII-4. Isoseismal Map of Humboldt County (p. 10)

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Active and Potentially Active Quaternary Faults within about 100 km of the Eureka High School (EHS)*

Fault/Fault Zone	Type	Distance from EHS (km/mi)	Magnitude
Lost Man/Sulphur Ck	R/rl	60/37	?
Grogan	R/rl	35/22	7.4
Bald Mountain	R/rl?	28/17	7.3
Fickle Hill (Mad River fz)	T	8/5	6.9
Freshwater	R	5/3	6.8
Little Salmon, onshore	T	8/5	7.0
Little Salmon, offshore	T	>8/5	7.1
Russ	R	37/23	6.3-7.2
Eaton Roughs-Lake Mtn	rl	35/22	7.4
Garberville-Maacama	rl	46/28	6.9
Mendocino fault	rl	52/32	7.5?
San Andreas	rl	63/39	8.3
Gorda plate (offshore)	ll, rl	60/37	7.5
Gorda plate (subducted)	ll, rl	22/14	7.5
CSZ (megathrust)	T	20/12	8.3-9.0

NOTES: * = not all known capable faults within 100 km of EHS are listed on this table. Omitted faults are either associated with a named system or are less capable. Examples include the Buhne Point, North Spit, and Bay Entrance faults associated with the Little Salmon fault at Humboldt Bay. Key to fault types: R = high-angle reverse, T = low-angle reverse (thrust), rl = right lateral strike-slip, ll = left lateral strike-slip, R/rl = high-angle reverse fault with a right-lateral component. Unless otherwise indicated in a following note, the cited magnitudes are moment magnitudes for a characteristic faulting event, as cited in Wesnousky (1986). Data for Lost Man/Sulphur Creek faults from Kelsey and Carver, 1988. Magnitude for Bald Mtn., Fickle Hill, Little Salmon, Garberville-Maacama, and Csz megathrust from Petersen et al., 1996; for the Russ fault, MCE, Kilbourne et al. (1980); for the Mendocino fault and Gorda plate (offshore), historic MCE, Dengler et al., 1992; and for Gorda plate (subducted), estimated herein.

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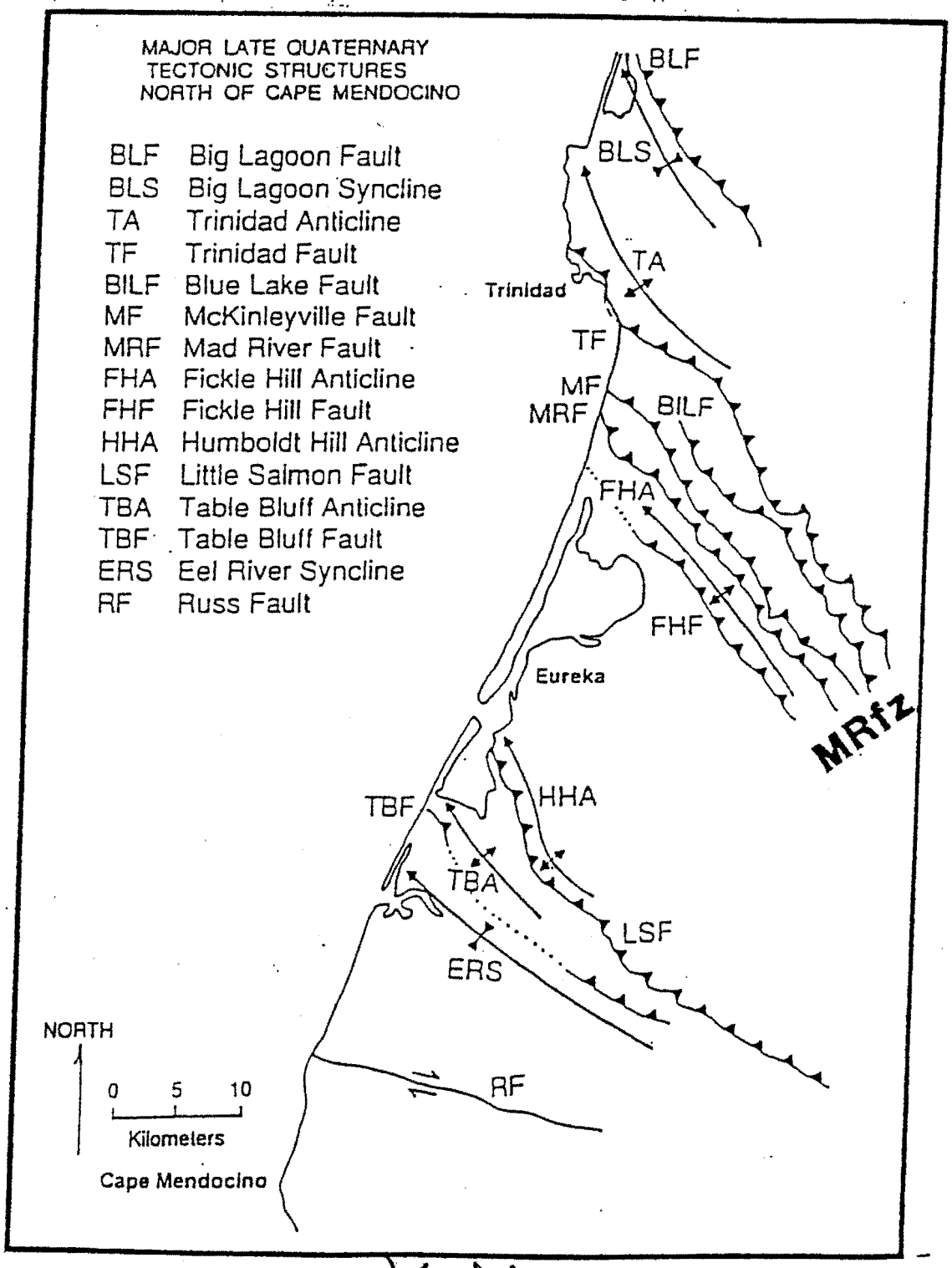
APPENDIX V FIGURE 1

Figure V-1. Tectonic Map of Northern California showing plate geometry and regionally significant Quaternary faults (modified from USGS, 1992). Hollow arrows indicates plate motion relative to a fixed North American plate.

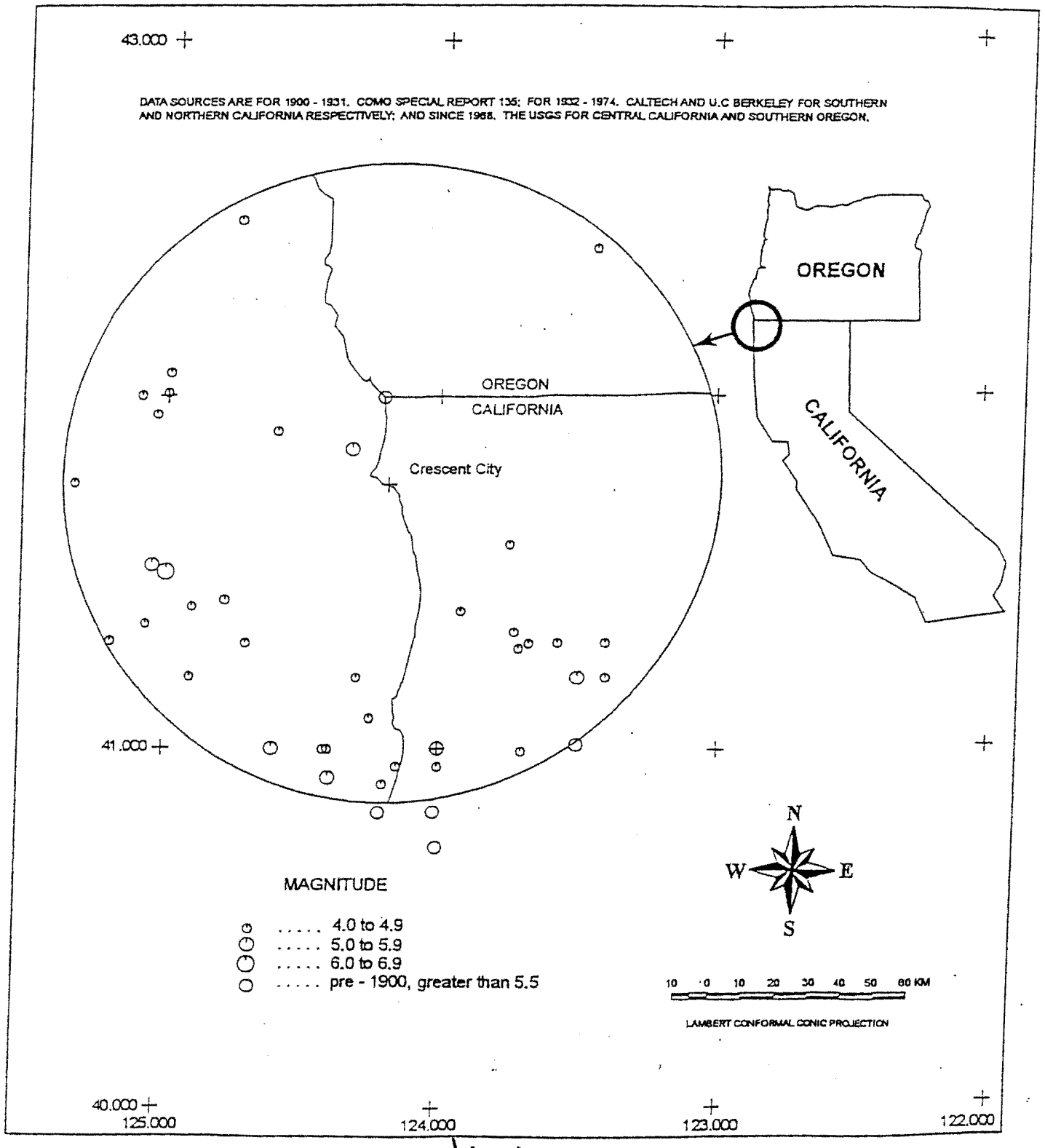
APPENDIX V FIGURE 2

Figure V-2. Principal Tectonic Structures in Coastal Humboldt County between Big Lagoon and Cape Mendocino (Carver, 1987). MRfz = Mad River fault zone.

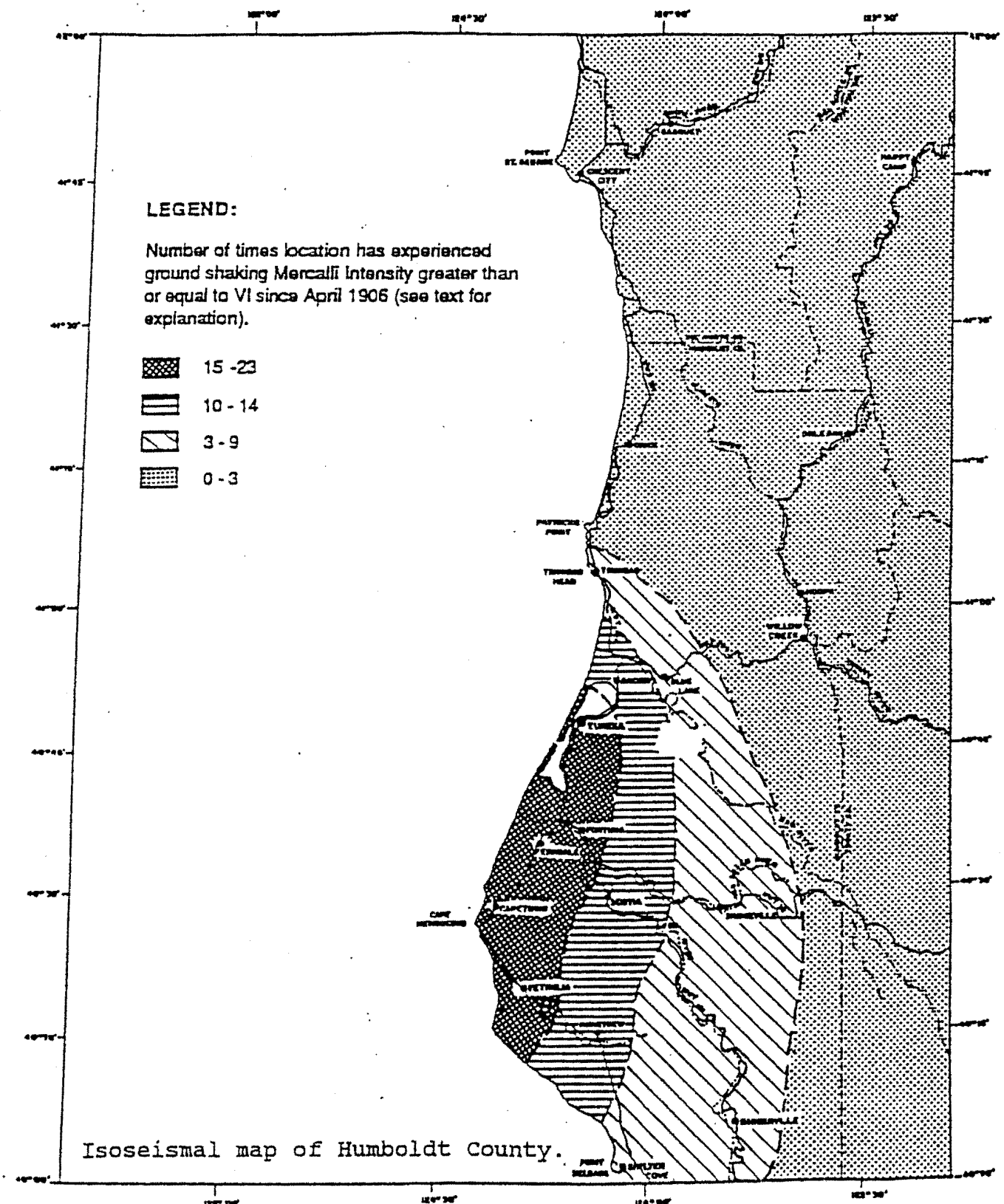


APPENDIX V FIGURE 3

Epicenter map of earthquakes of 4.0 M or greater (pre-1900, 5.5 M or greater) within 100 km of Crescent City. Modified from figure 4 and 5 of Kilbourne and Mualchin (1981).



APPENDIX V FIGURE 4



Isoseismal map of Humboldt County.

NORTHWESTERN CALIFORNIA

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APPENDIX VI

MODIFIED MERCALLI EARTHQUAKE INTENSITY SCALE

TABLE 11.4
MODIFIED MERCALLI SCALE, 1956 VERSION*

Intensity		Effects	v,† cm/s	a‡
M§	I.	Not felt. Marginal and long-period effects of large earthquakes (for details see text).		
3	II.	Felt by persons at rest, on upper floors, or favorably placed.		
	III.	Felt indoors. Hanging objects swing. Vibration like passing of light trucks. Duration estimated. May not be recognized as an earthquake.		0.0035–0.007
4	IV.	Hanging objects swing. Vibration like passing of heavy trucks; or sensation of a jolt like a heavy ball striking the walls. Standing motor cars rock. Windows, dishes, doors rattle. Glasses clink. Crockery clashes. In the upper range of IV wooden walls and frame creak.		0.007–0.015
	V.	Felt outdoors; direction estimated. Sleepers wakened. Liquids disturbed, some spilled. Small unstable objects displaced or upset. Doors swing, close, open. Shutters, pictures move. Pendulum clocks stop, start, change rate.	1–3	0.015–0.035
5	VI.	Felt by all. Many frightened and run outdoors. Persons walk unsteadily. Windows, dishes, glassware broken. Knickknacks, books, etc., off shelves. Pictures off walls. Furniture moved or overturned. Weak plaster and masonry D cracked. Small bells ring (church, school). Trees, bushes shaken (visibly, or heard to rustle—CFR).	3–7	0.035–0.07
6	VII.	Difficult to stand. Noticed by drivers of motor cars. Hanging objects quiver. Furniture broken. Damage to masonry D, including cracks. Weak chimneys broken at roof line. Fall of plaster, loose bricks, stones, tiles, cornices (also unbraced parapets and architectural ornaments—CFR). Some cracks in masonry C. Waves on ponds; water turbid with mud. Small slides and caving in along sand or gravel banks. Large bells ring. Concrete irrigation ditches damaged.	7–20	0.07–0.15
	VIII.	Steering of motor cars affected. Damage to masonry C; partial collapse. Some damage to masonry B; none to masonry A. Fall of stucco and some masonry walls. Twisting, fall of chimneys, factory stacks, monuments, towers, elevated tanks. Frame houses moved on foundations if not bolted down; loose panel walls thrown out. Decayed piling broken off. Branches broken from trees. Changes in flow or temperature of springs and wells. Cracks in wet ground and on steep slopes.	20–60	0.15–0.35
7	IX.	General panic. Masonry D destroyed; masonry C heavily damaged, sometimes with complete collapse; masonry B seriously damaged. (General damage to foundations—CFR.) Frame structures, if not bolted, shifted off foundations. Frames racked. Serious damage to reservoirs. Underground pipes broken. Conspicuous cracks in ground. In alluviated areas sand and mud ejected, earthquake fountains, sand craters.	60–200	0.35–0.7
8	X.	Most masonry and frame structures destroyed with their foundations. Some well-built wooden structures and bridges destroyed. Serious damage to dams, dikes, embankments. Large landslides. Water thrown on banks of canals, rivers, lakes, etc. Sand and mud shifted horizontally on beaches and flat land. Rails bent slightly.	200–500	0.7–1.2
	XI.	Rails bent greatly. Underground pipelines completely out of service.		>1.2
	XII.	Damage nearly total. Large rock masses displaced. Lines of sight and level distorted. Objects thrown into the air.	From Fig. 11.14	

NOTE: *Masonry A, B, C, D.* To avoid ambiguity of language, the quality of masonry, brick or otherwise, is specified by the following lettering (which has no connection with the conventional Class A, B, C construction).

- *Masonry A:* Good workmanship, mortar, and design; reinforced, especially laterally, and bound together by using steel, concrete, etc.; designed to resist lateral forces.
- *Masonry B:* Good workmanship and mortar; reinforced, but not designed to resist lateral forces.
- *Masonry C:* Ordinary workmanship and mortar; no extreme weaknesses such as non-tied-in corners, but masonry is neither reinforced nor designed against horizontal forces.
- *Masonry D:* Weak materials, such as adobe; poor mortar; low standards of workmanship; weak horizontally.

*From Richter (1958).[1] Adapted with permission of W. H. Freeman and Company.

†Average peak ground velocity, cm/s.

‡Average peak acceleration (away from source).

§Magnitude correlation.

25 February 2002

BUSCH GEOTECHNICAL CONSULTANTS

Diane Mutchie
Crescent City Planning Department
377 "J" Street
Crescent City, CA 95531

Re: **Synopsis of geologic comments delivered to Crescent City Planning Commission 2/14/2002 in response to public comments regarding the Kraft development proposal for 1100 Pebble Beach Drive, APN 118-300-03, Crescent City**

Dear Diane:

This letter briefly reiterates the main rebuttal points I made in response to comments by the public at the February 14th meeting. Please enter this into the written record in the appropriate way. I spoke approximately 15 minutes and spent a little over 2 hours preparing this summary.

Points I made include:

1. BGC's geologic report on the Kraft lot is site-specific;
2. the lot is not prone to either erosion or slope instability;
3. the bedrock at the lot is erosion-resistant dense sandstone;
4. arriving groundwater flows around the lot, not through it;
5. augering holes for concrete piers will not cause significant ground disruption;
6. BGC did a "powerful" quantitative slope stability analysis for the project;
7. my level of confidence in our conclusions about the lot is HIGH; and
8. the lot is one of the safest bluff-top properties along Pebble Beach Drive.

1) The engineering geology report Busch Geotechnical Consultants (BGC) did for the Kraft property (BGC, 2001) is "site-specific." We made observations on that lot and just seaward of it and based our conclusions on those observations. We did <u>not</u> draw conclusions from distant lots and apply them to the Kraft lot.

2) To simplify, <u>erosion</u> is the removal of soil and rock by wind, water, or ice, and <u>slope instability</u> is the mass movement of earth materials. When marine waves undercut the toe of a coastal bluff they sometimes cause the overlying slope to landslide. In lay language the slow landward retreat of a seacliff over time is "marine erosion" or "seacliff erosion." Over the project lifespan (30 to 75 years, depending upon which timeframe is specified), erosion can occur at the Kraft lot due to raindrop impact, running water, burrowing animals, tree fall, foot traffic, and other processes.

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Geotechnical and Geologic Studies for Land Development and Resource Management

Collectively, the effects of all these erosive processes are likely to be minor. More important, the bluff face is unlikely to experience slope instability. The base of the bluff is bedrock that is protected from marine erosion by a road that itself is protected.

3) There are three types of bedrock exposed along Pebble Beach Drive. The regional bedrock is the Franciscan Formation, but north of the lot a younger bedrock is exposed. The Franciscan bedrock can be erosion resistant or erosion-susceptible. At the lot, the bedrock is mainly a fractured dense sandstone, which is resistant to erosion and slope instability in comparison to the other type of Franciscan bedrock.

4) The top surface of the Franciscan bedrock along Pebble Beach is an ancient (~100,000-yr-old) wave-cut surface. The surface has relief (it isn't flat). Viewed from the beach, the top of the bedrock exposed in the bluff face on the Kraft lot drops down to the north and south. Because there was no groundwater in the sands on the lot when we did our subsurface exploration in November, 2000, we suspect the bedrock drops down to the east as well. If so, the bedrock on the lot is a "knob" or "hill." This means that groundwater flowing toward the coast from the east runs around the lot, not through it. This in turn means that the sands on the lot are less likely to fail than sands on nearby lots that seasonally are saturated by groundwater.

5) The foundation plan for the residence calls for cast-in-place concrete piers. To construct a pier, an auger (probably with 18"-diameter flights) must be advanced through the soils to bedrock. Since the soils do not contain cobbles, we anticipate that the auger will advance smoothly. That is, the auger should not "shudder" or vibrate excessively. We do not expect a borehole to collapse or even a small piece of the bluff face to fail due to vibrations.

6) To do a "qualitative" slope stability assessment an engineering geologist makes visual observations and classifies the stability of the property in question in light of his or her experience. In a "quantitative" assessment the geologist (or an engineer) puts soil layer data, the slope geometry, and soil strength information into a computer program that calculates the most likely failure location and the numerical risk that that a failure will occur. Quantitative or mathematical analysis is comparatively expensive but instills a greater degree of confidence. We did quantitative analysis for the Kraft lot in order to better know how far into the bluff a failure might "bite," and how likely that modeled failure is to occur. We concluded a failure is unlikely to occur, even in response to seismic shaking, but if a failure did occur, it would most likely "bite back" into the bluff no more than about 3 feet. As designed, the foundation is capable of tolerating such a slope failure (or larger) without foundation distress.

7) Busch Geotechnical Consultants has a high degree of confidence in its conclusions about the Kraft lot. A second opinion about the overall safety of the lot is unwarranted. (Technically, our opinion is a second opinion, because the project engineer, Lee Tromble, previously evaluated the lot [Tromble, 2001]. To generalize, he reached the conclusion that the lot is a "safe" building area.) If another engineering

geologist (or engineer) were to evaluate the lot, it is highly unlikely that he or she would reach any fundamentally different conclusion about the safety of the lot.

8) **In conclusion, from a geologic perspective, the Kraft lot is one of the "best" (safest) of the bluff-top lots along Pebble Beach.** This is because:

(1) The bedrock is an erosion resistant dense sandstone, not a relatively erodible rock type. The bedrock is unlikely to fail and is protected from marine erosion by a road and rocks below.

(2) The surface of the bedrock is shallow in the building area (it is about 15 ft down versus 30 ft in many other bluff top lots). Consequently, any failure of the overlying marine sands will be small (will bite only a few feet back into the lot).

(3) Arriving groundwater is not a problem in the sands on the lot because the water flows around the bedrock knob in the subsurface; and

(4) Erosion is readily controllable by conventional means.

I trust this letter provides the last of the geologic information and explanation you, the Planning Commission, and the general public need. If you have any questions, please call.

Respectfully submitted,

Busch Geotechnical Consultants

Bob Busch

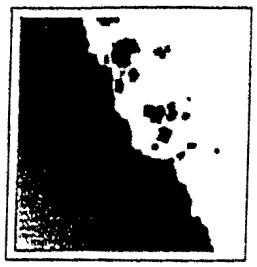
R. E. Busch, Jr., Ph.D.
C.E.G. #1448

REB: c:\MSW\Kraft.synopsis.ltr
Cc: Kraft, Tromble
No attachments

Reference Documents

BGC [Busch Geotechnical Consultants]. 2001. Site-specific geotechnical report, Kraft bluff-top property, Pebble Beach Drive, Crescent City, California. Unpubl. rept. for client [Kraft] dated December 20, on file with Crescent City Planning Department. 41 pp. incl. figs. and appendices.

Tromble, L. 2001. Soils and foundation investigation: APN 118-300-03. Unpubl. rept. for client [Kraft] dated 22 August, on file with Crescent City Planning Department. 5 pp. + figs.



25 February 2002

BUSCH GEOTECHNICAL CONSULTANTS

Diane Mutchie
Crescent City Planning Department
377 "J" Street
Crescent City, CA 95531

Re: **Synopsis of geologic comments delivered to Crescent City Planning Commission 2/14/2002 in response to public comments regarding the Kraft development proposal for 1100 Pebble Beach Drive, APN 118-300-03, Crescent City**

Dear Diane:

This letter briefly reiterates the main rebuttal points I made in response to comments by the public at the February 14th meeting. Please enter this into the written record in the appropriate way. I spoke approximately 15 minutes and spent a little over 2 hours preparing this summary.

Points I made include:

1. BGC's geologic report on the Kraft lot is site-specific;
2. the lot is not prone to either erosion or slope instability;
3. the bedrock at the lot is erosion-resistant dense sandstone;
4. arriving groundwater flows around the lot, not through it;
5. augering holes for concrete piers will not cause significant ground disruption;
6. BGC did a "powerful" quantitative slope stability analysis for the project;
7. my level of confidence in our conclusions about the lot is HIGH; and
8. the lot is one of the safest bluff-top properties along Pebble Beach Drive.

1) The engineering geology report Busch Geotechnical Consultants (BGC) did for the Kraft property (BGC, 2001) is "site-specific." We made observations on that lot and just seaward of it and based our conclusions on those observations. We did not draw conclusions from distant lots and apply them to the Kraft lot.

2) To simplify, erosion is the removal of soil and rock by wind, water, or ice, and slope instability is the mass movement of earth materials. When marine waves undercut the toe of a coastal bluff they sometimes cause the overlying slope to landslide. In lay language the slow landward retreat of a seacliff over time is "marine erosion" or "seacliff erosion." Over the project lifespan (30 to 75 years, depending upon which timeframe is specified), erosion can occur at the Kraft lot due to raindrop impact, running water, burrowing animals, tree fall, foot traffic, and other processes.

524 66
P.O. BOX 222 • ARCATA, CA 95518-0222 • 707-822-7300 • FAX 707-822-9011
Geotechnical and Geologic Studies for Land Development and Resource Management

Collectively, the effects of all these erosive processes are likely to be minor. More important, the bluff face is unlikely to experience slope instability. The base of the bluff is bedrock that is protected from marine erosion by a road that itself is protected.

3) There are three types of bedrock exposed along Pebble Beach Drive. The regional bedrock is the Franciscan Formation, but north of the lot a younger bedrock is exposed. The Franciscan bedrock can be erosion resistant or erosion-susceptible. At the lot, the bedrock is mainly a fractured dense sandstone, which is resistant to erosion and slope instability in comparison to the other type of Franciscan bedrock.

4) The top surface of the Franciscan bedrock along Pebble Beach is an ancient (~100,000-yr-old) wave-cut surface. The surface has relief (it isn't flat). Viewed from the beach, the top of the bedrock exposed in the bluff face on the Kraft lot drops down to the north and south. Because there was no groundwater in the sands on the lot when we did our subsurface exploration in November, 2000, we suspect the bedrock drops down to the east as well. If so, the bedrock on the lot is a "knob" or "hill." This means that groundwater flowing toward the coast from the east runs around the lot, not through it. This in turn means that the sands on the lot are less likely to fail than sands on nearby lots that seasonally are saturated by groundwater.

5) The foundation plan for the residence calls for cast-in-place concrete piers. To construct a pier, an auger (probably with 18"-diameter flights) must be advanced through the soils to bedrock. Since the soils do not contain cobbles, we anticipate that the auger will advance smoothly. That is, the auger should not "shudder" or vibrate excessively. We do not expect a borehole to collapse or even a small piece of the bluff face to fail due to vibrations.

6) To do a "qualitative" slope stability assessment an engineering geologist makes visual observations and classifies the stability of the property in question in light of his or her experience. In a "quantitative" assessment the geologist (or an engineer) puts soil layer data, the slope geometry, and soil strength information into a computer program that calculates the most likely failure location and the numerical risk that that a failure will occur. Quantitative or mathematical analysis is comparatively expensive but instills a greater degree of confidence. We did quantitative analysis for the Kraft lot in order to better know how far into the bluff a failure might "bite," and how likely that modeled failure is to occur. We concluded a failure is unlikely to occur, even in response to seismic shaking, but if a failure did occur, it would most likely "bite back" into the bluff no more than about 3 feet. As designed, the foundation is capable of tolerating such a slope failure (or larger) without foundation distress.

7) Busch Geotechnical Consultants has a high degree of confidence in its conclusions about the Kraft lot. A second opinion about the overall safety of the lot is unwarranted. (Technically, our opinion is a second opinion, because the project engineer, Lee Tromble, previously evaluated the lot [Tromble, 2001]. To generalize, he reached the conclusion that the lot is a "safe" building area.) If another engineering

geologist (or engineer) were to evaluate the lot, it is highly unlikely that he or she would reach any fundamentally different conclusion about the safety of the lot.

8) **In conclusion, from a geologic perspective, the Kraft lot is one of the "best" (safest) of the bluff-top lots along Pebble Beach.** This is because:

(1) The bedrock is an erosion resistant dense sandstone, not a relatively erodible rock type. The bedrock is unlikely to fail and is protected from marine erosion by a road and rocks below.

(2) The surface of the bedrock is shallow in the building area (it is about 15 ft down versus 30 ft in many other bluff top lots). Consequently, any failure of the overlying marine sands will be small (will bite only a few feet back into the lot).

(3) Arriving groundwater is not a problem in the sands on the lot because the water flows around the bedrock knob in the subsurface; and

(4) Erosion is readily controllable by conventional means.

I trust this letter provides the last of the geologic information and explanation you, the Planning Commission, and the general public need. If you have any questions, please call.

Respectfully submitted,

Busch Geotechnical Consultants

Bob Busch

R. E. Busch, Jr., Ph.D.
C.E.G. #1448

REB: c:\MSW\Kraft.synopsis.ltr
Cc: Kraft, Tromble
No attachments

Reference Documents

BGC [Busch Geotechnical Consultants]. 2001. Site-specific geotechnical report, Kraft bluff-top property, Pebble Beach Drive, Crescent City, California. Unpubl. rept. for client [Kraft] dated December 20, on file with Crescent City Planning Department. 41 pp. incl. figs. and appendices.

Tromble, L. 2001. Soils and foundation investigation: APN 118-300-03. Unpubl. rept. for client [Kraft] dated 22 August, on file with Crescent City Planning Department. 5 pp. + figs.

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29 July 2002

BUSCH GEOTECHNICAL CONSULTANTS

Tom Kraft
Beth Forest Family Trust
P.O.B. 35
Fort Dick, CA 95538

Diane Mutchie
Crescent City Planning Department
377 "J" Street
Crescent City, CA 95531

RE: **Insignificance of quarrying of Preston Island to slope stability of 1100 Pebble Beach Drive, Crescent City, CA [APN 118-300-03; Kraft]**

INTRODUCTION

This letter addresses geologic issues raised by some of the homeowners living near 1100 Pebble Beach Drive in their 18 May 2002 "Grounds for Appeal" letter. Item "B" of their letter states:

> **"B. Non-consideration by the Busch Geotechnical Consultants of an important geological factor, contributing to site stability.** The subject property and adjacent property was subjected to extensive and powerful blasting during the quarrying of Preston Island and the construction of the existing roadway on the property in the mid and early 20th century. It would be expected that fracturing of the underlying dense sandstone bedrock would have occurred, allowing ground waters to percolate below the proposed building site, and possibly providing fracture lines for slippage with increased site loading."

As described in our foundation soils engineering report on the site (BGC, 2001), the ground surface of the subject property is developed on ~2 ft of native topsoils overlying ~11 ft of late Pleistocene marine sediments (sands overlying gravels), which in turn are underlain by the regional bedrock (Jurassic-Cretaceous Franciscan Complex lithologies). Where visible in the road cut below the building area of the lot, the bedrock consists primarily of fractured and jointed, erosion-resistant, dense, massive, graywacke sandstone.

For most single-family residential projects we assess the stability of the site using qualitative ("eyes only") methods. However, because we anticipated a high degree of public and regulatory scrutiny of the Kraft project (because of its location), we assessed the stability of the site quantitatively rather than qualitatively. That is, rather than simply stating our opinion based on visual observations alone, we ran a sophisticated mathematical analysis called "Factor of Safety" (FOS) analysis. To complete the FOS analysis we input measured and assumed site parameters such as the number of soil layers, the strength of each layer (in terms of its density [γ], cohesion [c], and angle of internal friction [ϕ], the depth to the groundwater table, and the seismic coefficient. We varied these parameters within a range of appropriate values, and made multiple reiterative calculations. Based on our work we stated,

> "In conclusion, a consideration of the observed site conditions and the results of our preliminary FOS analysis suggests that:
> 1, the most probable slope failure mode is shallow landsliding of weathered surficial soils on the face of the bluff (see Figure 6);
> 2, on the critical profile, FOS_s = 1.31 and the failure sole intersects the ground surface ~2 feet east of the break-in-slope, well west of the house footprint; and
> 3, on the profile line, FOS_d = 1.11, extending ~10 ft east of the break-in-slope, which would lie within the house footprint (Figure 7).
>
> In plain English, these results suggest that under the most extreme static condition imaginable (the groundwater table at the surface), a static slope failure would not extend into the home footprint. Because the modeled groundwater level cannot occur at the site, the FOS_s is conservative (low). The model condition cannot occur because the subsoils are mostly well drained sands overlying high permeability gravels. Although a long duration, intense rain might cause a groundwater table to form in the basal few feet of the marine terrace sediments, our FOS analysis suggests that it is unlikely that the slope will fail in response to temporarily elevated water levels."

In even plainer English, the site is "stable" under "everyday" conditions 2 feet and more behind the existing break-in-slope at the top edge of the bluff, and it is "stable" under the predictable earthquake shaking conditions 10 feet and more behind the same break-in-slope.

OBSERVATIONS, CONCLUSIONS, AND RATIONALE

This text-section presents observations, conclusions, and the underlying rationale that relates to the issues raised by the appellants.

1) Comparison of Bedrock at the Site with Nearby Bedrock Outcrops: Regionally, Franciscan Complex bedrock contains a wide variety of lithologies, all naturally fractured and jointed as a result of the manner in which the parent sediments were lithified and then emplaced along the edge of the continent. The most common Franciscan Complex lithologies are mudstone (or argillite), siltstone, sandstone, greenstone (altered pillow basalt), and chert. More exotic lithologies (such as blue schist) exist as well. Geologists consider sandstone, greenstone, and chert to be "hard" rocks generally capable of withstanding marine erosion better than mudstone and siltstone, which typically are interbedded and more pervasively fractured.

The bedrock at the Kraft site, sandstone, which is exposed in the roadcut below the building area of the lot, is fractured and jointed no differently than nearby exposures (at Battery Point and the former Seaside Hospital site, for example) that have not been subjected to quarrying or even road construction (BGC, 2000). In fact, the bedrock at the lot is no differently fractured than the same type of bedrock all along the coast of Humboldt and Del Norte Counties. The fractures at the site all tend to have rough surfaces (rather than polished or "slickensided" ones) and the fracture spacing varies from closely spaced to more widely spaced. That is, some beds have numerous fractures whereas adjacent beds have few fractures. In addition, there are no significant intraformational discontinuities—such as shear zones—that could act as slope failure slippage zones.

2) Absence of Drill Holes: We observed no remnant drill holes in the bedrock at the Kraft site. Although the island reportedly was first quarried by the Hobbs Wall Company prior to 1900 (Hoffman, 2002, pers. commun.), we do not know what extraction method the contractor used. In 1927, when Preston Island initially was quarried for jetty rock by Morrison & Knutsen (Kraft, 2002, pers. commun), the contractor excavated three tunnels ("coyote holes") into the eastern side of the island, then set off black power (perhaps several tons) in the holes to fracture the rock (DNC, 1970). Although the historical records we reviewed do not report how the rock was quarried after the initial blasting, it is likely that drilling and blasting was used. At a

previous Crescent City quarry site (a pile of large rocks about 500 ft offshore of the old cemetery) rock was extracted by drilling holes into large rocks, then tamping dynamite into place and exploding it to break up the rock (DNC, 1970). If this was done at Preston Island, there is no evidence on the Kraft lot: there are no remnant drill holes in the entire exposure. At most quarry sites we have worked (e.g., BGC, 1995, 1999), remnant drill holes are visible.

Although blasting by the more powerful "coyote hole" method sounds threatening, the quarry site is named Preston Island, not Preston promontory. That is, the island was separated from the Kraft site by air. The sound waves of explosions alone could not have affected the Kraft site (also see items 3) and 4), following).

3) **Absence of Recent Fractures in the Bedrock:** We also did not observe any recent-appearing ("fresh") fractures in the bedrock. Such fractures presumably would have been formed by the blasting and would cross-cut older fractures. Instead, there is a measurable pattern to the fractures in the bedrock. The fractures, which were formed by tectonic processes, occur in multiple conjugate (paired) sets with distinct angular relationships to one another. The orientation of the fracture sets is interpretable in terms of the directions of tectonic stress that produced the fractures, but there are no "unrelated," recent fractures with azimuth directions unrelated to the tectonic fractures.

4) **Absence of Fractures in the Marine Terrace Sediments:** More importantly, there are no fractures in the unconsolidated marine sediments that overlie the bedrock. This observation provides unequivocal evidence that the site was not directly affected by blasting.

Here is the essence of the underlying rock mechanics theory. If an explosive charge is detonated near a free surface (i.e., a bluff face), the magnitude of the observable damage to the earth materials is a function of the elastic response of the rock and the geometry of the free face (GA, 1981). In other words, the degree of structural damage (if any) is related to the shear strength of the affected materials and the distance of the blast holes from the bluff face. At the site, both Franciscan bedrock and unconsolidated marine sediments are present. The bedrock has a much higher strength (even with the tectonic fractures) than the overlying unconsolidated marine sediments. It has been demonstrated that explosives will break (fracture) rock at distances of 10 to 20 blast hole diameters from the point of detonation (GA, 1981). For example, if a blast hole diameter of 1.5" is used, then structural damage conceivably

can extend 1.25 to 2.5 ft into the surrounding materials. In contrast, if a 4" blast hole diameter is used (with a correspondingly greater charge), then fracturing can occur up to ~7 ft away.

Because there are no fractures in the late Pleistocene sediments, there is a lack of direct evidence for blast induced fracturing at the site. Stated another way, if blasting did occur "near" the site, it did not occur near enough to cause fracturing of the cover sediments at the building site. If it did not fracture the sediments, then it could not have affected the bedrock. We therefore conclude that the existing bluff face was not directly affected by the quarrying of Preston Island or by the construction of the road.

We did not verify if the road below the site, which purportedly was built in the early 1900s, is a full-bench (100% excavated) or partial-bench (part excavated, part filled). Typically, cut-fill (partial bench) road construction is used in stable "hard terrain" to save costs. Based on visual observations only, we infer that the roadbed is a partial bench, and that the face of the outcrop on the lot was formed by relatively recent grading activities related to city road improvements for public access to the Preston Island rock and tidal beach areas (CCPC, 2002), not blasting associated with the quarrying,.

5) Deep Groundwater at the Site. We (BGC, 2001) and the project engineer (TE, 2001) both have reported no groundwater within the site sediments. TE (2001) dug an exploratory trench and BGC hand-augered a borehole. In addition, we did not observe seeps or springs emerging from the base of the sediments exposed in the roadcut (in November, 2001). We noted (ibid., p. 8) that the presence of a reentrant on the north property line and a south-sloping bedrock surface south of the property indicate that the bedrock at the site is an ancient sea stack whose top was planed off. That is, the lot appears to sit on a bedrock "high" that is surrounded by more permeable marine terrace sediments to the north, east, and south. The absence of groundwater in the marine terrace sediments on the lot supports this working hypothesis: groundwater approaching the site from inland terrace areas apparently flows around, rather than through, the site. During times of especially high groundwater inland from the site, groundwater is likely to move through the fractures within the sandstone bedrock and emerge as seeps near or below the road.

SUMMARY CONCLUSIONS

Based primarily on the lack of direct evidence of blasting in the bedrock (there are no remnant drill holes in the sandstone, nor "young" fractures that cross-cut older tectonic fractures) and on the absence of fractures in the sediments capping the bedrock, **we conclude that blasting did not affect the site in any way.**

Based on the observed lack of groundwater in the site sediments, even during winter conditions, and on the inferred subsurface topography of the site and the high secondary permeability of the fractured sandstone bedrock, **we conclude that groundwater is unlikely to ever adversely affect the stability of the site or to cause other problems.**

We believe the stability of the site is as stated in our initial report (ibid., p. 16): "In its present condition, the bluff-top homesite has a LOW risk of slope failure under static ("'everyday") conditions. The risk that the homesite will landslide under the dynamic conditions of a strong seismic event, e.g., during a Cascadia subduction zone earthquake of M_w 8.0+, as modeled for the Crescent City area, or in response to especially adverse but temporary groundwater conditions (saturated soils under high pore water pressures), also is LOW."

Our overall, summary conclusions are that the Kraft site is acceptably stable and that additional geotechnical studies do not need to be done. We did not mention the quarrying of Preston Island in our initial report because it had NO affect on the stability of the site and therefore did not merit, much less require, discussion.

CLOSURE and AUTHENTICATION

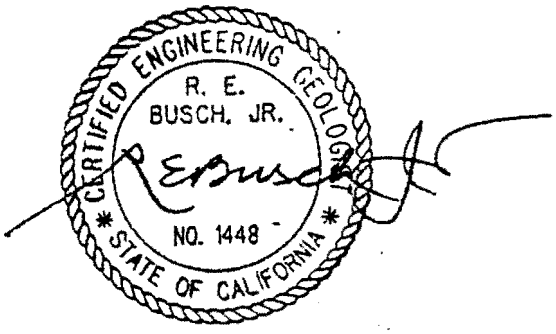
We reached our conclusions by performing an initial site-specific geotechnical study for the property (BGC, 2001), which included a mathematical (FOS) analysis of the stability; by reviewing the project engineer's work (TE, 2001) in light of our data; by inspecting selected nearby sandstone bedrock outcrops along Pebble Beach Drive, for this report; by reviewing various historical documents (e.g., DNC, 1970) and talking to various knowledgeable individuals; and by researching the general effects of blasting on earth materials. Completing an exhaustive search of historical documents, including photographs, was out of our scope of work.

We trust that this letter provides the last of the geologic information you need. If you have questions, please call. Again, thank you for hiring us.

Busch Geotechnical Consultants

Steve Bacon
Staff Engineering Geologist

R. E. Busch, Jr., Ph.D.
C.E.G. #1448



REB: c:\MSW\Kraft.CC_Appeal.ltr

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BGC [Busch Geotechnical Consultants]. 2001. Site-specific geotechnical report, Kraft bluff-top property, Pebble Beach Drive, Crescent City, California. Unpubl. rept. for client [Kraft] dated December 20, on file with Crescent City Planning Department. 41 pp. incl. figs. and appendices.

BGC [Busch Geotechnical Consultants]. 2000. Results of geotechnical investigation, site for proposed Redwood Oceanfront Resort, 100 "A" Street, Crescent City, Del Norte County, California [Yuan]. Unpubl. rept. for client [Redwood Oceanfront Resort, LLC] dated Oct. 30. 70 pp. (incl. appends.) + over-sized fig.

BGC [Busch Geotechnical Consultants]. 1999. Engineering geology of the Scheve Quarry, California Mine ID No. 9108-0014, Del Norte County, to supplement Reclamation Plan SCH # 98042068. Unpubl. rept. for clients, Del Norte Co. Resources Agency, and State of California, Dept. of Conservation, Office of Mine Reclamation, dated 22 March 1999.

BGC [Busch Geotechnical Consultants]. 1995. Preliminary estimate of volume of "jetty rock" available from Bankus Quarry, Brookings, Curry County, Oregon. Unpubl. letter delivered to client [South Coast Lumber Co.] dated April 3. 4 pp.

CCPC [Crescent City Planning Commission]. 2002. Revised Staff Report for the applicant Tom Kraft-agent for Beth M. Forest Trust dated February 14, 2002. On file with Crescent City Planning Department. 10 pp. including attachments.

DNC [Del Norte County]. 1970. Crescent City Breakwater, IN, Historical Society Bulletin. On file with Crescent City Planning Department. 9 pp. including 5 photos.

GA [Golder Associates]. 1981. Rock Slopes: Design, Excavation, Stabilization. Prepared for U.S. Department of Transportation, Federal Highway Administration. 361 pp., including appends.

Hoffman, B. 2002. Personal communication with Bud Hoffman by Diane Mutchie.

Kraft, T. 2002. Personal communication from Tom Kraft.

TE [Tromble Engineering]. 2001. Soils and foundation investigation: APN 118-300-03. Unpubl. rept. for client [Kraft] dated 22 August, on file with Crescent City Planning Department. 5 pp. + figs.

Jim Baskin

From: Mark Johnsson
Sent: Wednesday, December 11, 2002 5:17 PM
To: Jim Baskin; Bob Merrill; Chuck Damm
Subject: FW: Kraft lot, Crescent City, CA, Factor of Safety Figure

-----Original Message-----
From: Bob Busch [mailto:bob@buschgeotech.com]
Sent: Wednesday, December 11, 2002 3:58 PM
To: Diane Mutchie
Cc: Mark Johnsson
Subject: Kraft lot, Crescent City, CA, Factor of Safety Figure

Dear Diane and Mark,
Here, attached, is a figure that shows where on the critical profile of the lot the foundation setback plots and the FOSs = 1.5 failure plane is.

As I have pointed out, it is not necessary to set back behind the FOSs 1.5 line because the home will rest on a pier foundation embedded into rock.

Good luck at the hearing.

Bob Busch, C.E.G. #1449

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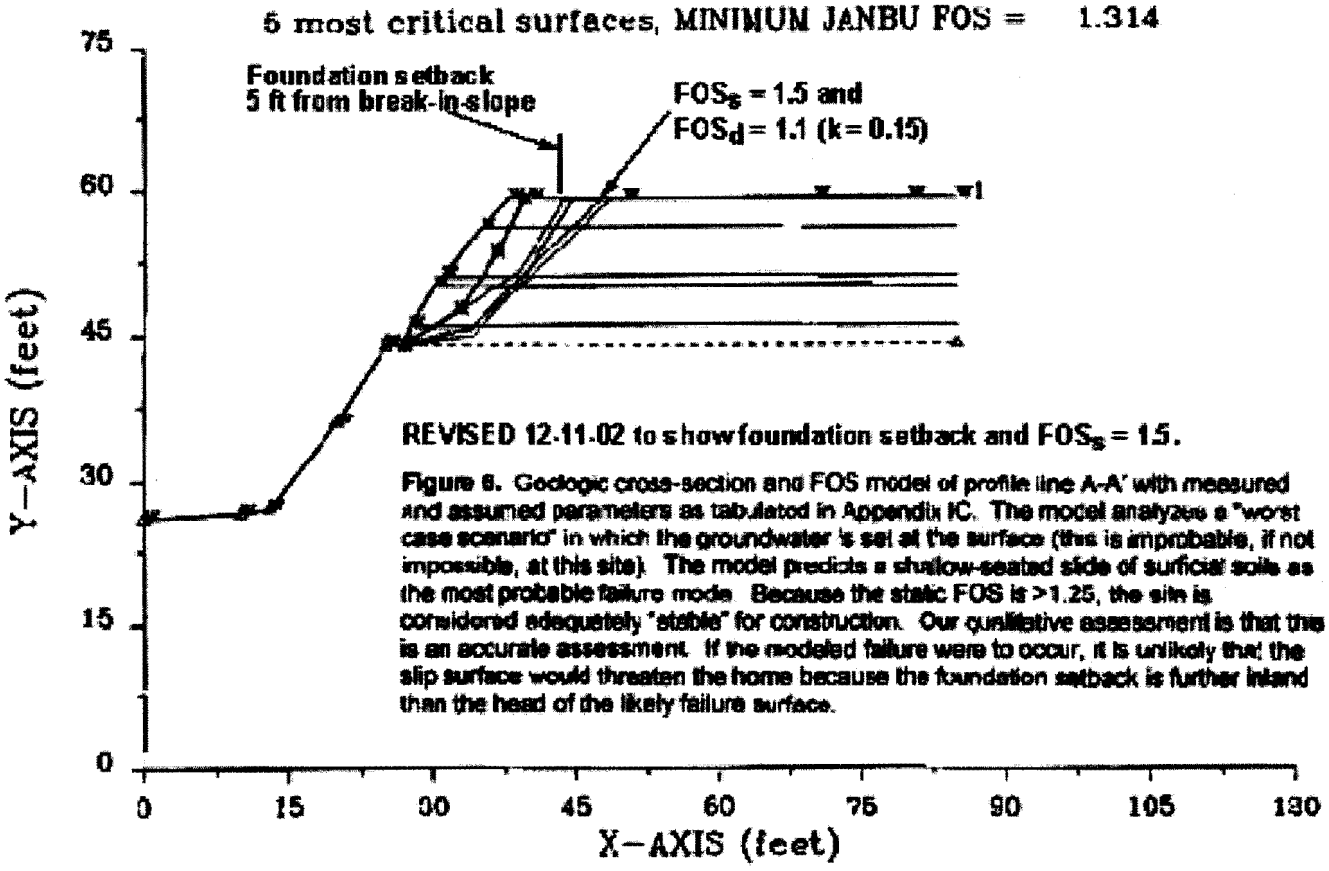


REVISED 12-11-02 to show foundation setback and FOS$_s$ = 1.5.

Figure 6. Geologic cross-section and FOS model of profile line A-A' with measured and assumed parameters as tabulated in Appendix IC. The model analyzes a "worst case scenario" in which the groundwater is set at the surface (this is improbable, if not impossible, at this site). The model predicts a shallow-seated slide of surficial soils as the most probable failure mode. Because the static FOS is >1.25, the site is considered adequately "stable" for construction. Our qualitative assessment is that this is an accurate assessment. If the modeled failure were to occur, it is unlikely that the slip surface would threaten the home because the foundation setback is further inland than the head of the likely failure surface.

LEE TROMBLE ENGINEERING
879 J Street, Ste. A
Crescent City, CA 95531
Phone (707) 464-1293
FAX (707) 465-8358

January 24, 2003

Mr. Bob Merrill
Mr. Jim Baskin
California Coastal Commission
P.O. Box 4908
Eureka, CA 95502-4908

re: Foundation (Beth Forest Trust CDP)

Dear Sirs:

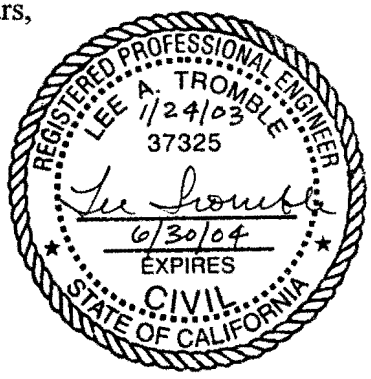
Please find attached my cross section showing the revised foundation configuration for the Beth Forest Trust proposed residential development of APN 118-300-03 in Crescent City. As you know, the foundation will be constructed of reinforced concrete piers and grade beams. The proposed piers have been moved further inland to clear the revised critical slip plane surface (FOS=1.5) as determined by Busch Geotechnical.

Attached are my sample calculations using a pier spacing of 14 feet and a 10 foot grade beam cantilever transverse to the slope. Since the piers must be embedded to bedrock, the skin friction on the most inland piers can easily resist the uplift forces resulting from the cantilever.

It is therefor my conclusion that the proposed foundation system can be constructed to support the residence provided the design is in compliance with the Uniform Building Code, recommendations as set forth in the Busch Geotechnical Report and sound engineering practice.

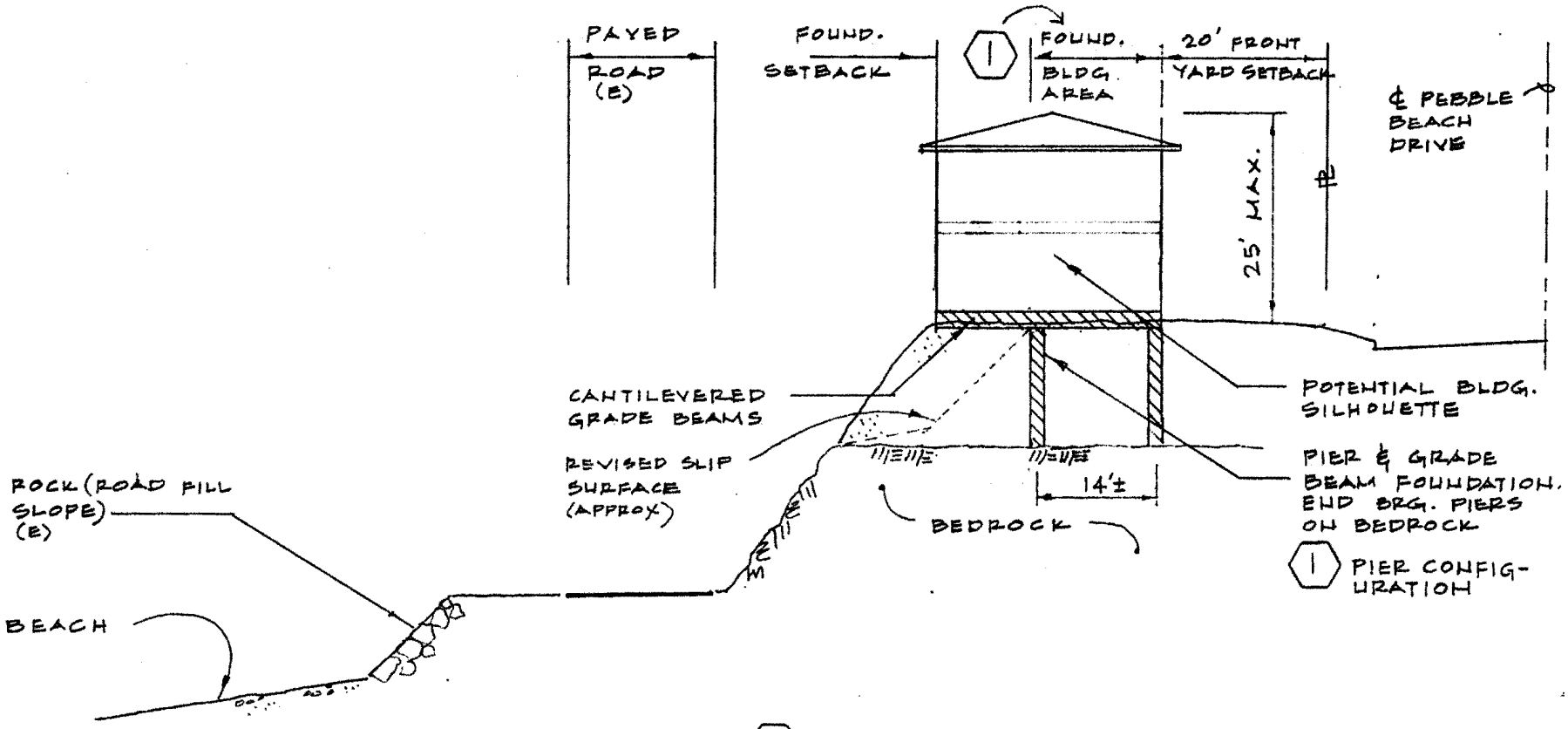
If you have any questions or if you need any additional information regarding this matter, please don't hesitate to call.

Very truly yours,



Lee Tromble

6 of 6



1 PIER CONFIGURATIONS REVISED PER R.E. BUSCH FACTOR OF SAFETY/SLIP SURFACE ANAYSIS. REVISED 1/23/03

65 & 66

A CROSS SECTION

SCALE: 1" = 20' H & V

BY LT DATE 1/23/03 SUBJECT SAMPLE CALCS KRAFT FOUNDATION SHEET NO. 1 OF 1

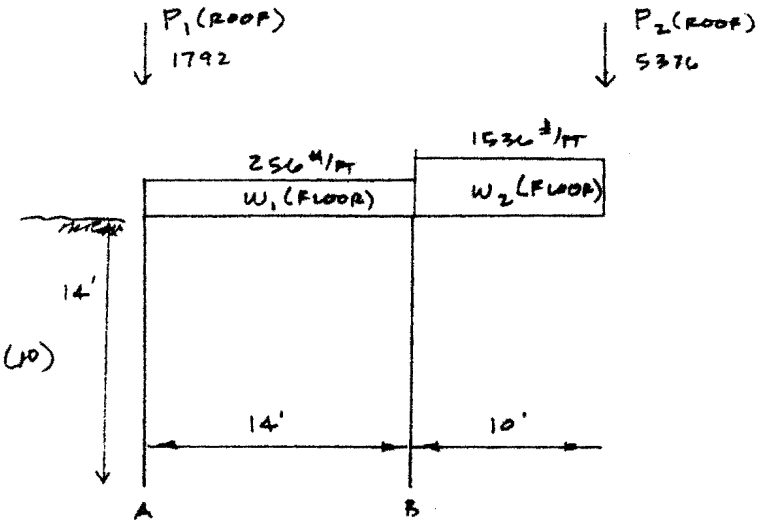
CHKD. BY DATE JOB NO. 1018

$P_1 = (14)(8)(16) = 1792^{\#}$

$P_2 = (14)(8+16)16 = 5376^{\#}$

$w_1 = 2(8)16 = 256^{\#}$

$w_2 = 2(8+40)16 = 1536$ plf



$\Sigma M_B = 0 \quad \circlearrowleft +$

$-1792(14) - 256(14)7 + 1536(10)5 + 5376(10) - 14 V_A = 0$

$V_A = 5740^{\#}$

20" ϕ PIER WGHT $= 14(\pi(.83)^2(150) = 4580^{\#}$

FOR F.S. = 1.5

e.g. FRAMES @ 16' O.C.

SKIN FRICTION $= \dfrac{5740(1.5) - 4580}{2\pi(.83)14} = 55$ psf $<$ 300 psf (CONSERVATIVE ALLOWABLE SKIN FRICTION TO RESIST UPLIFT)