Staff Report to the Zoning Administrator

Application Number: 171261

Applicant: Brett Brenkwitz
Owner: Krach/Sisney
APN: 033-132-03 & 14

Agenda Date: April 6, 2018
Agenda Item #: 1
Time: After 9:00 a.m.

Project Description: Proposal to recognize emergency repair of cave collapse along the upper portion of the coastal bluff on the property line of APNs 033-132-03 and 033-132-14. Requires a Coastal Development Permit.

Location: Properties located on the south side of Opal Cliff Drive approximately mid-block between the intersections with Portola Drive and Court Drive (4640 and 4660 Opal Cliff Drive).

Supervisorial District: First District (District Supervisor: John Leopold)

Permits Required: Coastal Development Permit

Staff Recommendation:

- Determine that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.
- Approval of Application 171261, based on the attached findings and conditions.

Exhibits

A.	Categorical Exemption (CEQA determination)	F.	Geological/Geotechnical letters
B.	Findings	G.	Assessor's, Location, Zoning and General Plan Maps
C.	Conditions	H.	Comments & Correspondence
D.	Project plans		
E.	Site Photos		

Parcel Information

Parcel Size:	13,000 square feet & 28,000 square feet
Existing Land Use - Parcel:	Residential
Existing Land Use - Surrounding:	Residential
Project Access:	Opal Cliff Drive
Planning Area:	Live Oak
Land Use Designation:	R-UM (Urban Medium Density Residential)

Zone District:	R-1-5 (Single Family Residential - 5,000 square foot minimum)
Coastal Zone:	_X_ Inside __ Outside
Appealable to Calif. Coastal Comm.	_X_ Yes __ No

Environmental Information

Geologic Hazards:	Coastal bluff
Soils:	Soils report accepted 6/6/17
Fire Hazard:	Not a mapped constraint
Slopes:	Coastal bluff
Env. Sen. Habitat:	Not mapped/no physical evidence on site
Grading:	313 cubic yards (fill)
Tree Removal:	No trees proposed to be removed
Scenic:	Not a mapped resource
Drainage:	Existing drainage adequate
Archeology:	Not mapped

Services Information

Urban/Rural Services Line:	_X_ Inside __ Outside
Water Supply:	Soquel Creek Water District
Sewage Disposal:	Santa Cruz County Sanitation District
Fire District:	Central Fire Protection District
Drainage District:	Flood Control District 5

Project Setting

The subject parcels are located on the south side of Opal Cliff Drive approximately mid-block between the intersections with Portola Drive and Court Drive. The main portion of the property, an area of around 7,460 square feet which is occupied by the dwelling and yard area, is roughly level with a slight slope away from the coastal bluff. However, the southeastern end of the parcel, an area of around 2,740 square feet, drops away almost vertically to the beach 45 to 50 feet below. The coastal bluff, an elevated marine terrace, has historically been protected by concrete seawalls at its base. The nearest access to the beach is located approximately 700 feet southwest of the subject parcels.

History

On or in the days prior to April 20, 2017, a collapse of a sea cave occurred behind an existing seawall located below the subject properties. The cave collapse created an unstable, overhanging section of coastal bluff above the seawalls.

Upon receipt of inspection letters from the project geologist, Easton Geology, Inc., dated May 18, 2017 and the project geotechnical engineer, Haro, Kasunich and Associates, dated May 17, 2017, the County Geologist and Civil Engineer conducted a site inspection to confirm the extent of the cave collapse. Due to the unstable and continued unpredictable site conditions which posed a threat to life

and limb and to the structure located on APN 033-132-03 and potentially to the existing home located on APN 033-132-14 an emergency repair permit to infill the cave was necessary and a (SCCC 16.10.105 & 16.10.070 H(3)(a),(b) and (c)),.

An emergency coastal permit, and associated grading/building permit (B-172665) was issued on June 19, 2017, allowing for the stabilization of the cave collapse. The repair of the cave collapse was identified as Phase 1 of 2, for the work necessary to ensure stability of the coastal bluff. Phase 1 included plugging the cave with concrete and injection grouting to permeate the void space within and around the rubble on the bottom of the cave. A shotcrete structural form (plate) extends above the plugged cave and seawall to provide support to the overhanging bluff. Project plans prepared by Bowman and Williams Civil Engineers are on file with the Planning Department (Exhibit D).

Phase 2 will include installation of a deepened footing or "cut-off wall" to be located at the base of the existing undermined seawall located on APN 033-132-14 (below mean high tide). Given the location of the future cut-off wall, Phase 2 will require a Coastal Development Permit from the California Coastal Commission. This project has been conditioned to require the permit holder to obtain the necessary permit(s) for Phase 2, which have not been fully evaluated under this permit.

All work associated with the issued grading/building permit has been completed. Final letters from the project geologist and geotechnical engineer have been provided to the County indicating that all work has been completed in accordance with their recommendations.

Zoning & General Plan Consistency

The subject properties are approximately 13,000 square feet & 28,000 square feet, located in the R-1-5 (Single Family Residential - 5,000 square foot minimum) zone district, a designation which allows residential uses and is consistent with the R-UM (Urban Medium Density Residential) General Plan designation.

The proposed coastal bluff repair is consistent with General Plan Policy 6.2.16 (Structural Shoreline Protection Measures) in that it is necessary to ensure the safety of the home(s) located on top of the bluff, as well as to protect the life and safety of beachgoers below. The project does not reduce or restrict existing beach access, adversely affect shoreline processes, increase erosion on adjacent properties or cause harmful impacts to wildlife and fish habitats, or archaeological or paleontological resources. The shotcrete plate does pose a slight impact on sand supply which has been evaluated by the project geologist, Easton Geology, Inc. Total sand loss was calculated to be 14 yards of retained beach material which will be mitigated through payment of $890.00 to County Parks (Exhibit F). Detailed technical studies have been reviewed and accepted which demonstrate the need for the proposed shoreline protection structure.

Potential alternatives to construction of the concrete plug and associated shotcrete plate include (1) refraining from construction of any repair, (2) partial fill of the cave and/or (3) placement of a vertical wall, such as a drilled pier or pin-pile retaining structure behind the cave.

1. Refrainment of any repair would not only jeopardize the life and safety of beachgoers, or the structures located on the top of the bluff, but would also jeopardize the existing seawall.

Further collapse of the bluff face may impact the seawall by causing complete failure or rotation of the wall seaward, so that it no longer functions as designed.

2. Partial fill of the cave would not eliminate the hazards to beachgoers, nor to the structures located atop the bluff, and would also not eliminate the potential for further collapse and damage to the existing seawall.

3. Placement of a drilled pier pin-pile wall may eliminate potential hazards to the structures located atop the bluff, but would not eliminate the hazards posed to beachgoers below. This design would include 50-60 foot deep piers which may be economically infeasible.

Local Coastal Program Consistency

The proposed cave collapse repair is in conformance with the County's certified Local Coastal Program, in that the structure is sited and designed to be visually compatible and integrated with the surrounding coastal bluff in order to minimize impacts to coastal views. The project would be conditioned to ensure the aesthetic character and structural performance of the bluff repair remains in its approved condition for the expected 50-year life of the structure.

Project alternatives for stabilizing the cave collapse were limited due to the eminent hazard and continued unstable, unpredictable site conditions. Removal of debris from the cave cavity and additional exploration of the extent of the damage were determined by the project geologist and county staff to be unsafe. The proposed project was determined to be the preferred alternative in terms of mitigating the hazard and to ensure safety for workers.

Geologic and geotechnical (soils) inspection letters have been reviewed and accepted by the County of Santa Cruz (Exhibit F). Review of the inspection letters confirmed the necessity of the project, and all work has been performed in conformance with the approved plans (Exhibit D).

The project site is located between the shoreline and the first public road and is not identified as a priority acquisition site in the County's Local Coastal Program. The project will not interfere with public access to the beach or ocean, in that there is currently no public access to the beach on the subject parcel or in the immediate vicinity. The nearest existing coastal access is located approximately 700 feet to the southwest (Private's Beach).

Conclusion

As proposed and conditioned, the project is consistent with all applicable codes and policies of the Zoning Ordinance and General Plan/LCP. Please see Exhibit "B" ("Findings") for a complete listing of findings and evidence related to the above discussion.

Staff Recommendation

- Determine that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.

- **APPROVAL** of Application Number **171261,** based on the attached findings and conditions.

Supplementary reports and information referred to in this report are on file and available for viewing at the Santa Cruz County Planning Department, and are hereby made a part of the administrative record for the proposed project.

The County Code and General Plan, as well as hearing agendas and additional information are available online at: www.co.santa-cruz.ca.us

Report Prepared By: Nathan MacBeth
Santa Cruz County Planning Department
701 Ocean Street, 4th Floor
Santa Cruz CA 95060
Phone Number: (831) 454-3118
E-mail: nathan.macbeth@santacruzcounty.us

CALIFORNIA ENVIRONMENTAL QUALITY ACT
NOTICE OF EXEMPTION

The Santa Cruz County Planning Department has reviewed the project described below and has determined that it is exempt from the provisions of CEQA as specified in Sections 15061 - 15332 of CEQA for the reason(s) which have been specified in this document.

Application Number: 171261
Assessor Parcel Number: 033-132-03 & 14
Project Location: 4640 & 4660 Opal Cliff Drive

Project Description: Recognize emergency repair of sea cave collapse with coastal bluff stabilization intended to protect existing residential uses.

Person or Agency Proposing Project: Brett Brenkwitz

Contact Phone Number: (831) 662-8800

A. _____ The proposed activity is not a project under CEQA Guidelines Section 15378.

B. _____ The proposed activity is not subject to CEQA as specified under CEQA Guidelines Section 15060 (c).

C. _____ **Ministerial Project** involving only the use of fixed standards or objective measurements without personal judgment.

D. _____ **Statutory Exemption** other than a Ministerial Project (CEQA Guidelines Section 15260 to 15285).

E. __X__ **Categorical Exemption**

Specify type: Class 1 - Existing Facilities (Section 15301) & Class 3 – New Construction or Conversion of Samll Structures (Section 15303)

F. Reasons why the project is exempt:

Recognize emergency repair of sea cave collapse with installation of coastal bluff stabilization structure.

In addition, none of the conditions described in Section 15300.2 apply to this project.

_____ Date: _____

Nathan MacBeth, Project Planner

EXHIBIT A

Coastal Development Permit Findings

1. That the project is a use allowed in one of the basic zone districts, listed in section 13.10.170(D) as consistent with the General Plan and Local Coastal Program LUP designation.

This finding can be made, in that the properties are zoned R-1-5 (Single Family Residential - 5,000 square foot minimum), a designation which allows residential uses. The repair to the coastal bluff is an allowed use within the zone district in that the repair is necessary to protect the existing homes on site and ensure the safety of beachgoers below the subject properties. The zoning is consistent with the site's R-UM (Urban Medium Density Residential) General Plan designation.

The proposed coastal bluff repair is consistent with General Plan Policy 6.2.16 in that it is necessary to ensure the safety of the homes located on top of the bluff and life and safety of beachgoers. Detailed technical studies have been reviewed and accepted which demonstrate the need for the proposed shoreline protection structure and a thorough analysis of potential alternatives has been completed, which, as discussed in the staff report, demonstrates that none of the alternatives are acceptable to protect existing development and public safety. The project would not reduce or restrict existing beach access.

2. That the project does not conflict with any existing easement or development restrictions such as public access, utility, or open space easements.

This finding can be made, in that no such easements or restrictions are known to encumber the project site.

3. That the project is consistent with the design criteria and special use standards and conditions of this chapter pursuant to Section 13.20.130 and Section 13.20.140 et seq.

This finding can be made, in that the project is consistent in with the other bluff stabilization projects in terms of design. The finish color of the cave repair is consistent with the surrounding natural land formations. The project was designed to minimize potential visual impacts to the greatest extent feasible and has been textured to match the surrounding face of the coastal bluff. The project has been conditioned to require the structure be maintained in perpetuity to ensure the structure remains consistent with coastal design criteria.

4. That the project conforms with the public access, recreation, and visitor-serving policies, standards and maps of the General Plan and Local Coastal Program land use plan, specifically Chapter 2: figure 2.5 and Chapter 7, and, as to any development between the nearest through public road and the sea or the shoreline of any body of water located within the coastal zone, such development is in conformity with the public access and public recreation policies of Chapter 3 of the Coastal Act commencing with section 30200.

This finding can be made, in that the project site is located between the shoreline and the first public road however, the project will not interfere with public access to the beach, ocean, or any nearby body of water. Existing beach access (Private's Beach) exists approximately 700 feet west of the subject properties. The project site is not identified as a priority acquisition site in the County Local

EXHIBIT B

Coastal Program.

5. That the proposed development is in conformity with the certified local coastal program.

This finding can be made, in that the structure has been designed in accordance with General Plan Policy 6.2.16 (Structural Shoreline Protection Measures). Stabilization of the bluff is necessary to mitigate a geologic hazard resulting in unsafe beach conditions and threatening the existing residential uses on the subject properties which are allowed uses in the R-1-5 (Single Family Residential - 5,000 square foot minimum) zone district, as well as the General Plan and Local Coastal Program land use designation.

Many similar bluff stabilization projects have been approved in the vicinity. The project is consistent in terms of design and typical for this type of emergency repair. Finish color and texture of the repair are consistent with the surrounding coastal bluff. As stated in the staff report, several alternatives were evaluated and were not feasible, due to the eminent hazard to the existing structures and beachgoers below, nor economically viable.

The proposed coastal bluff repair is consistent with General Plan Policy 6.2.16 in that it is necessary to ensure the safety of the homes located on top of the bluff and life and safety of beachgoers. Detailed technical studies have been reviewed and accepted which demonstrate the need for the proposed shoreline protection structure and a thorough analysis of potential alternatives has been completed, which, as discussed in the staff report, demonstrates that none of the alternatives are acceptable to protect existing development and public safety. The project would not reduce or restrict existing beach access.

Development Permit Findings

1. That the proposed location of the project and the conditions under which it would be operated or maintained will not be detrimental to the health, safety, or welfare of persons residing or working in the neighborhood or the general public, and will not result in inefficient or wasteful use of energy, and will not be materially injurious to properties or improvements in the vicinity.

This finding can be made, in that the project is located in an area designated for residential uses. The cave infill has been constructed in conformance with the recommendations of the project geotechnical engineer and geologist and complies with prevailing building technology, the California Building Code, and the County Building ordinance to ensure the optimum in safety and the conservation of energy and resources. The structure will not be materially injurious to properties or improvements in the vicinity in that it has been designed to blend into the natural coastal bluff and will protect the site and adjacent parcels from future erosion processes, and will protect beachgoers from bluff collapse hazards.

2. That the proposed location of the project and the conditions under which it would be operated or maintained will be consistent with all pertinent County ordinances and the purpose of the zone district in which the site is located.

This finding can be made, in that the location of the cave repair and the conditions under which it would be operated and maintained will be consistent with all pertinent County ordinances and the purpose of the R-1-5 (Single-Family Residential) zone district. The primary use of the property will continue to be residential uses which necessitate installation of the cave repair to ensure safety of the existing residential structures on the subject properties and beachgoers.

3. That the proposed use is consistent with all elements of the County General Plan and with any specific plan which has been adopted for the area.

This finding can be made, in that an emergency coastal development permit and associated grading/building permit were issued for the cave repair due to an eminent risk to health and safety. As indicated in a letter from Easton Geology, Inc. dated May 18, 2017, potential further failure of the cave would result in significant instantaneous retreat of the upper portion of the coastal bluff resulting in a threat to improvements atop the bluff and beachgoers below.

The project has been designed in accordance with General Plan Policy 6.2.16 (Structural Shoreline Protection Measures). The shoreline protection structure is intended to address the immediate hazard due to the unsafe site conditions, and is not limited to protection of existing structures. Several alternatives were evaluated (as stated above) and were not feasible, due to the eminent hazard to the existing structures and beachgoers below, nor economically viable. Removal of debris from the cave cavity and additional exploration of the extent of the damage was determined by the project geologist and county staff to be infeasible. The proposed project was determined to be the preferred alternative in terms of mitigating the hazard, as well as to ensure safety for workers. Construction equipment was staged in the rear yard of APN 033-132-14. Construction of the concrete plug was completed via a concrete pump boom located at the top of the bluff to ensure impacts to the beach would be minimized.

A specific plan has not been adopted for this portion of the County.

4. That the proposed use will not overload utilities and will not generate more than the acceptable level of traffic on the streets in the vicinity.

This finding can be made, in that the coastal bluff repair is to be constructed on an existing developed lot intended to protect the bluff from further erosion and potential hazard to the existing dwellings. Beyond the construction phase, the bluff repair will not require the use of utilities and will not generate additional traffic on the streets in the vicinity.

5. That the proposed project will complement and harmonize with the existing and proposed land uses in the vicinity and will be compatible with the physical design aspects, land use intensities, and dwelling unit densities of the neighborhood.

This finding can be made, in that the project is located along a coastal bluff which is subject to coastal erosion. The subject parcels are both developed with existing single family dwellings. In terms of design, the project is consistent with seawalls and repairs in the vicinity. The façade of the cave repair has been textured and colored to match the surrounding bluff face in order to minimize potential impacts to visual resources to the greatest extent possible. Construction of an upper-bluff retaining wall, to protect the existing home, does result in any change to the existing

land use intensity and density of the neighborhood.

6. The proposed development project is consistent with the Design Standards and Guidelines (sections 13.11.070 through 13.11.076), and any other applicable requirements of this chapter.

This finding can be made, in that the cave collapse repair has been textured and colored to match the adjacent natural bluff face in order to blend with the natural environment. Further, the project intended to restore the bluff to a "pre-collapse" condition. Consequently, the project does not result in adverse impacts to coastal views.

Conditions of Approval

Exhibit D: Project plans, 4 sheets, prepared by Bowman & Williams, dated 9/12/17.

I. This permit recognizes the construction of an emergency repair of a sea cave collapse as indicated on the approved Exhibit "D" for this permit. This approval does not confer legal status on any existing structure(s) or existing use(s) on the subject property that are not specifically authorized by this permit. Prior to exercising any rights granted by this permit including, without limitation, any construction or site disturbance, the applicant/owner shall:

A. Sign, date, and return to the Planning Department one copy of the approval to indicate acceptance and agreement with the conditions thereof.

B. Submit proof that a Coastal Protection Structure Maintenance and Monitoring Program has been recorded in the official records of the County of Santa Cruz (Office of the County Recorder) within 30 days from the effective date of this permit.

C. Submit an application for a Coastal Development Permit to the California Coastal Commission for installation of a cutoff wall located at the base of the existing seawall within 60 days of approval of this Coastal Development Permit.

D. Obtain a Building Permit from the Santa Cruz County Building Official for construction of the deepened footing or "cut-off wall" at the base of the existing seawall on APN 033-132-14 (Phase 2) within 6 months of the issuance of the Coastal Development Permit.

1. Any outstanding balance due to the Planning Department must be paid prior to submittal of this Building Permit application. Applications for subsequent Building Permits will not be accepted or processed while there is an outstanding balance due.

E. Submit proof that these conditions have been recorded in the official records of the County of Santa Cruz (Office of the County Recorder) within 30 days from the effective date of this permit.

F. Pay Sand Loss Mitigation fees to the County of Santa Cruz in accordance with the letter from Easton Geology, Inc. dated January 4, 2018 for the coastal bluff stabilization (cave collapse).

II. Prior to issuance of a Building Permit (for the cut-off wall) the applicant/owner shall:

A. Submit final plans for review and approval by the Planning Department. The final plans shall be in substantial compliance with the Coastal Development Permit and shall include the following additional information:

1. Grading, drainage, and erosion control plans.

EXHIBIT C

B. Meet all requirements of the Environmental Planning section of the Planning Department.

C. Submit 2 copies of any technical reports prepared by the project geologist and geotechnical (soils) engineer.

III. All construction shall be performed according to the approved plans for the Building Permit. Prior to final building inspection, the applicant/owner must meet the following conditions:

A. All improvements shown on the final approved Building Permit plans for the cut-off wall shall be installed.

B. All inspections required by the building permit shall be completed to the satisfaction of the County Building Official.

C. The project must comply with all the recommendation stated in the technical reports prepared by the project geologist and geotechnical engineer.

D. Pursuant to Sections 16.40.040 and 16.42.080 of the County Code, if at any time during site preparation, excavation, or other ground disturbance associated with this development, any artifact or other evidence of an historic archaeological resource or a Native American cultural site is discovered, the responsible persons shall immediately cease and desist from all further site excavation and notify the Sheriff-Coroner if the discovery contains human remains, or the Planning Director if the discovery contains no human remains. The procedures established in Sections 16.40.040 and 16.42.080, shall be observed.

IV. Operational Conditions

A. The Development Approval Holder shall comply with the Coastal Protection Structure Maintenance and Monitoring Program.

B. In the event that future County inspections of the subject property disclose noncompliance with any Conditions of this approval or any violation of the County Code, the owner shall pay to the County the full cost of such County inspections, including any follow-up inspections and/or necessary enforcement actions, up to and including permit revocation.

V. As a condition of this development approval, the holder of this development approval ("Development Approval Holder"), is required to defend, indemnify, and hold harmless the COUNTY, its officers, employees, and agents, from and against any claim (including attorneys' fees), against the COUNTY, it officers, employees, and agents to attack, set aside, void, or annul this development approval of the COUNTY or any subsequent amendment of this development approval which is requested by the Development Approval Holder.

A. COUNTY shall promptly notify the Development Approval Holder of any claim,

EXHIBIT C

action, or proceeding against which the COUNTY seeks to be defended, indemnified, or held harmless. COUNTY shall cooperate fully in such defense. If COUNTY fails to notify the Development Approval Holder within sixty (60) days of any such claim, action, or proceeding, or fails to cooperate fully in the defense thereof, the Development Approval Holder shall not thereafter be responsible to defend, indemnify, or hold harmless the COUNTY if such failure to notify or cooperate was significantly prejudicial to the Development Approval Holder.

B. Nothing contained herein shall prohibit the COUNTY from participating in the defense of any claim, action, or proceeding if both of the following occur:

1. COUNTY bears its own attorney's fees and costs; and

2. COUNTY defends the action in good faith.

C. Settlement. The Development Approval Holder shall not be required to pay or perform any settlement unless such Development Approval Holder has approved the settlement. When representing the County, the Development Approval Holder shall not enter into any stipulation or settlement modifying or affecting the interpretation or validity of any of the terms or conditions of the development approval without the prior written consent of the County.

D. Successors Bound. "Development Approval Holder" shall include the applicant and the successor'(s) in interest, transferee(s), and assign(s) of the applicant.

Minor variations to this permit which do not affect the overall concept or density may be approved by the Planning Director at the request of the applicant or staff in accordance with Chapter 18.10 of the County Code.

Please note: This permit expires three years from the effective date listed below unless the conditions of approval are complied with and the use commences before the expiration date.

Approval Date: _____

Effective Date: _____

Expiration Date: _____

_____
Wanda Williams
Deputy Zoning Administrator

Appeals: Any property owner, or other person aggrieved, or any other person whose interests are adversely affected by any act or determination of the Zoning Administrator, may appeal the act or determination to the Planning Commission in accordance with chapter 18.10 of the Santa Cruz County Code.

EXHIBIT C

J:\B&W\26000\26083.01 ... 4600 Opal Cliff Dr\dwg\EMERGENCY PERMIT CD FOR COLLAPSE BEHIND SEAWALL\26083.01 EMERGENCY PERMIT PLANS COLLAPSE BEHIND WALL.dwg, 8/31/2017 7:42:15 AM, DWG To PDF.pc3

JENNIFER KRACH & CAROL SISNEY

EMERGENCY SEAWALL MAINTENANCE & CLIFF STABILIZATION PLANS

4640 & 4660 OPAL CLIFF, SANTA CRUZ CALIFORNIA 95062

PROJECT DESCRIPTION

THE PROJECT WILL BE FOR THE EMERGENCY MAINTENANCE AND REPAIR OF AN EXISTING PERMITTED SEAWALL. THE EMERGENCY MAINTENANCE AND REPAIR WILL INCLUDE THE REPAIR OF A COLLAPSED SECTION OF CLIFF BEHIND THE EXISTING SEAWALL.

THE PROPOSED EMERGENCY MAINTENANCE AND REPAIR WORK IS CONSISTENT WITH SANTA CRUZ COUNTY PERMIT NO. [illegible] APPROVING THE EXISTING SEAWALL AND WILL COMPLY WITH THE REQUIREMENTS OF THE CONDITIONS OF APPROVAL OF THE PERMIT AND THE CURRENT STATE LANDS COMMISSION LEASE ASSOCIATED WITH THE SEAWALL.

THE MAINTENANCE AND REPAIR PERFORMED PURSUANT TO THESE PLANS WILL BE DONE IN A MANNER CONSISTENT WITH THE MONITORING AND MAINTENANCE PROGRAM RECORDED IN THE OFFICE OF THE SANTA CRUZ COUNTY RECORDER ON APRIL [illegible] AS DOCUMENT NO. [illegible] IN COMPLIANCE WITH THE CONDITIONS OF SANTA CRUZ COUNTY PERMIT NUMBER [illegible].

THE PROJECT WILL BE CONSISTENT WITH THE RECOMMENDATIONS PROVIDED IN THE HARO KASUNICH LETTER ENTITLED "EMERGENCY SEA WALL MAINTENANCE CONSTRUCTION SEQUENCE" PROJECT NO. [illegible], DATED 5 JUNE 2017.

CONSTRUCTION ACCESS AND EQUIPMENT STORAGE:

WORK ON THE UPPER CLIFF STABILIZATION WILL BE PERFORMED FROM AN OSHA APPROVED CRANE HUNG BASKET.

CONCRETE WILL BE DELIVERED BY PUMP FROM THE BACKYARD OF 4660 OPAL CLIFF DRIVE.

EQUIPMENT AND CONSTRUCTION MATERIALS WILL BE STORED IN THE BACK YARD OF THE 4660 OPAL CLIFF DRIVE RESIDENCE ON TOP OF THE CLIFF. NO CONSTRUCTION EQUIPMENT OR ACTIVITIES WILL ENTER THE WATERS OF THE MONTEREY BAY AND ALL CONSTRUCTION ACTIVITIES WILL BE LIMITED TO THE SMALLEST AREA PRACTICAL.

APPROXIMATE CONSTRUCTION SEQUENCE

BLUFF REPAIR

PERFORMING ALL WORK FROM AN OSHA APPROVED CRANE HUNG BASKET

DAY 1

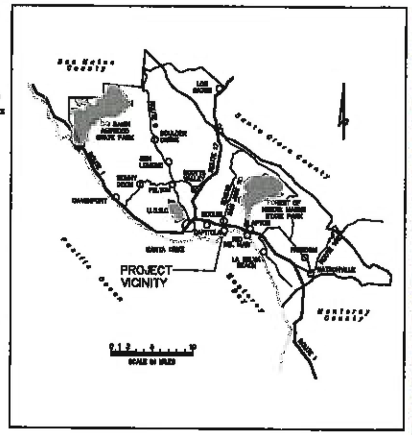
1. INSTALL 1/2" DIAMETER PIPES FOR GROUT INJECTION INTO MATERIAL AT BOTTOM OF CAVITY. PIPES TO BE INSTALLED AT 3 FOOT SPACING.
2. USING PUMP DELIVERED CONCRETE DELIVERED FROM THE BLUFF ABOVE. BACKFILL CAVITY IN 2-1/2 FOOT LIFTS IN A CONTINUOUS OPERATION. BACKFILL TO WITHIN 3 FEET FROM TOP OF EXISTING SEAWALL.

DAY 2

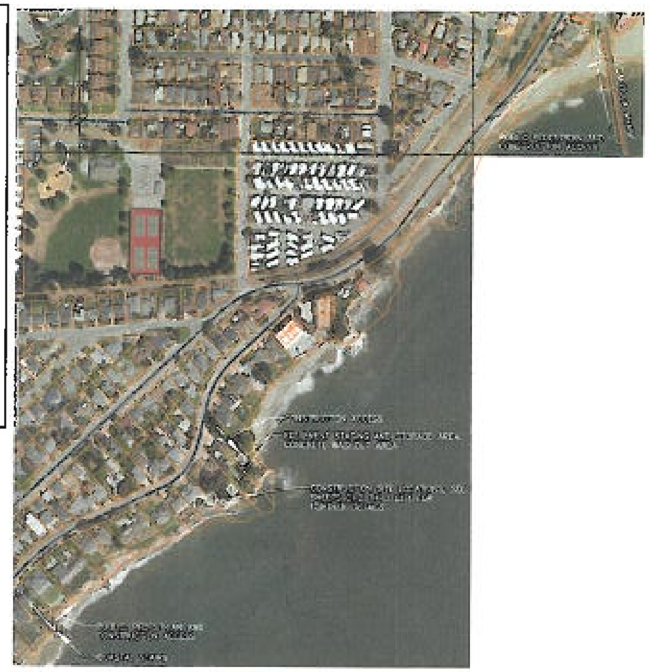
1. INSTALL 4" DIAMETER PIPES FOR DRAINAGE.
2. PERMEABLE INJECTION GROUT INTO MATERIAL AT BOTTOM OF CAVITY USING 1/2" DIAMETER PIPES.
3. BACKFILL PORTION OF CAVITY ABOVE EXISTING SEAWALL WITH GUNITE COLORED "SAN DIEGO BUFF" TO WITHIN 1 FOOT OF FINAL FINISHED PROFILE.

DAY 3

1. DRILL AND INSTALL DOWELS INTO CONCRETE FACE.
2. INSTALL EPOXY COATED REBAR CAGE WITH 2 INCHES CLEAR OF GUNITE SURFACE. BACKFILL REMAINING 1 FOOT SECTION WITH GUNITE COLORED "SAN DIEGO BUFF." FINISH WITH "ART ROCK PATTERN.



VICINITY MAP



COUNTY GIS AERIAL PHOTO

SCALE 1"=200'

GRAPHIC SCALE

(IN FEET)
1 inch = 200 ft.

CONSTRUCTION REQUIREMENTS

1. ALL WORK SHALL TAKE PLACE DURING DAYLIGHT HOURS AND LIGHTING OF THE BEACH AREA IS PROHIBITED.
2. CONSTRUCTION WORK OR EQUIPMENT OPERATIONS SHALL NOT BE CONDUCTED BELOW THE MEAN HIGH WATER LINE UNLESS TIDAL WATERS HAVE RECEDED FROM THE AUTHORIZED WORK AREAS.
3. GRADING IN INTERTIDAL AREAS IS PROHIBITED EXCEPT AS OTHERWISE PERMITTED WITH TWO EXCEPTIONS AS FOLLOWS: 1) AS NECESSARY TO IMPLEMENT THE MAINTENANCE PLAN AND ANY FUTURE AUTHORIZED MAINTENANCE ACTIVITY, AND 2) ANY MATERIAL FROM THE SEAWALL THAT HAS MIGRATED SEAWARD OF THE REVETMENT, THAT IS NATURALLY EXPOSED, AND THAT CAN BE RETRIEVED WITHOUT SUBSTANTIAL EXCAVATION OF THE SURROUNDING SEDIMENTS, SHALL BE RETRIEVED TO AN APPROPRIATE LOCATION ACCEPTABLE TO THE PLANNING DIRECTOR. ANY EXISTING MATERIALS RETRIEVED IN THIS MANNER SHALL BE RECOVERED BY EXCAVATION EQUIPMENT POSITIONED LANDWARD OF THE WATERLINE (I.E. CRANE FROM TOP OF CLIFF). UNDER THIS PROJECT.
4. ONLY RUBBER-TIRED CONSTRUCTION VEHICLES ARE ALLOWED ON THE BEACH, EXCEPT TRACK VEHICLES WHICH MAY BE USED IF THE GOVERNING AGENCY AGREES THAT THEY ARE REQUIRED TO SAFELY CARRY OUT CONSTRUCTION. WHEN TRANSITING ON THE BEACH, ALL SUCH VEHICLES SHALL REMAIN AS HIGH ON THE UPPER BEACH AS POSSIBLE AND AVOID CONTACT WITH OCEAN WATERS AND INTERTIDAL AREAS.
5. ALL CONSTRUCTION MATERIALS AND EQUIPMENT PLACED ON THE BEACH DURING DAYLIGHT CONSTRUCTION HOURS SHALL BE STORED BEYOND THE REACH OF TIDAL WATERS. ALL CONSTRUCTION MATERIALS AND EQUIPMENT SHALL BE REMOVED IN THEIR ENTIRETY FROM THE BEACH AREA BY SUNSET EACH DAY THAT WORK OCCURS. THE ONLY EXCEPTIONS SHALL BE FOR EROSION AND SEDIMENT CONTROLS AND/OR CONSTRUCTION AREA BOUNDARY FENCING WHERE SUCH CONTROLS AND/OR FENCING ARE PLACED AS CLOSE TO THE TOE OF THE SEAWALL AS POSSIBLE, AND ARE MINIMIZED IN THEIR EXTENT, AND FOR ROCK AND CONCRETE MATERIALS THAT ARE IN THE PROCESS OF BEING RELOCATED.
6. CONSTRUCTION (INCLUDING BUT NOT LIMITED TO REPAIR AND MAINTENANCE CONSTRUCTION ACTIVITIES, AND MATERIALS AND/OR EQUIPMENT STORAGE) IS PROHIBITED OUTSIDE OF THE DEFINED CONSTRUCTION, STAGING, AND STORAGE AREAS.
7. NO WORK SHALL OCCUR ON THE BEACH AREA DURING WEEKENDS AND/OR THE SUMMER PEAK MONTHS (I.E., FROM THE SATURDAY OF MEMORIAL DAY WEEKEND THROUGH LABOR DAY, INCLUSIVE) UNLESS, DUE TO EXTENUATING CIRCUMSTANCES (SUCH AS TIDAL ISSUES OR OTHER ENVIRONMENTAL CONCERNS), THE PLANNING DIRECTOR AUTHORIZES SUCH WORK.
8. EQUIPMENT WASHING SHALL NOT TAKE PLACE ON THE BEACH; REFUELING AND/OR SERVICING OF EQUIPMENT SHALL BE ALLOWED ONLY AT A DESIGNATED LOCATION AS NOTED ON THE AS NOTED ON THE CONSTRUCTION PLAN. APPROPRIATE BEST MANAGEMENT PRACTICES SHALL BE USED TO ENSURE THAT NO SPILLS OF PETROLEUM PRODUCTS OR OTHER CHEMICALS TAKE PLACE DURING THESE ACTIVITIES.
9. THE CONSTRUCTION SITE SHALL MAINTAIN APPROPRIATE PROTECTIVE CONSTRUCTION SITE HOUSEKEEPING CONTROLS AND PROCEDURES (E.G., CLEAN UP ALL LEAKS, DRIPS, AND OTHER SPILLS IMMEDIATELY; KEEP MATERIALS COVERED AND OUT OF THE RAIN, INCLUDING COVERING EXPOSED PILES OF SOIL AND WASTES; DISPOSE OF ALL WASTES PROPERLY, PLACE TRASH RECEPTACLES ON SITE FOR THAT PURPOSE, AND COVER OPEN TRASH RECEPTACLES DURING WET WEATHER; REMOVE ALL CONSTRUCTION DEBRIS FROM THE BEACH).
10. ALL EROSION AND SEDIMENT CONTROLS SHALL BE IN PLACE PRIOR TO THE CONSTRUCTION AS WELL AS AT THE END OF EACH WORKDAY. AT A MINIMUM, SILT FENCES, OR EQUIVALENT APPARATUS, SHALL BE INSTALLED AT THE PERIMETER OF THE CONSTRUCTION SITE TO PREVENT CONSTRUCTION-RELATED RUNOFF AND/OR SEDIMENT FROM ENTERING INTO THE PACIFIC OCEAN.
11. ALL BEACH AREAS AND ALL BEACH ACCESS POINTS IMPACTED BY CONSTRUCTION ACTIVITIES SHALL BE RESTORED TO THEIR PRE-MAINTENANCE ACTIVITY CONDITION OR BETTER WITHIN THREE DAYS OF COMPLETION OF CONSTRUCTION. ANY BEACH SAND IMPACTED SHALL BE FILTERED AS NECESSARY TO REMOVE ALL CONSTRUCTION DEBRIS FROM THE BEACH.
12. THE PERMITTEE SHALL NOTIFY THE PLANNING DIRECTOR AT LEAST THREE WORKING DAYS IN ADVANCE OF COMMENCEMENT OF CONSTRUCTION, AND IMMEDIATELY UPON COMPLETION OF CONSTRUCTION.
13. NO WORK SHALL BEGIN UNTIL ANY NECESSARY PERMITS, NOTIFICATIONS OR APPROVALS HAVE BEEN GRANTED BY STATE LANDS COMMISSION, MONTEREY BAY NATIONAL MARINE SANCTUARY AND THE ARMY CORP OF ENGINEERS AND A PRECONSTRUCTION MEETING HAS BEEN COMPLETED.

ALL REQUIREMENTS ABOVE AND ALL REQUIREMENTS OF THE APPROVED CONSTRUCTION PLAN SHALL BE ENFORCEABLE COMPONENTS OF THE PERMIT. THE PERMITTEE SHALL CARRY OUT MAINTENANCE IN ACCORDANCE WITH THE APPROVED CONSTRUCTION PLAN

ABBREVIATIONS

APN	ASSESSOR'S PARCEL NUMBER
BM	BENCHMARK
CONC	CONCRETE
CONST	CONSTRUCT
CP	CONTROL POINT
EX.	EXISTING
FW	FACE OF WALL

DISCLAIMER

THE DATA SET FORTH ON THIS SHEET IS THE PROPERTY OF BOWMAN & WILLIAMS CONSULTING CIVIL ENGINEERS. IT IS AN INSTRUMENT OF SERVICE AND MAY NOT BE REPRODUCED, ALTERED, OR USED WITHOUT THE CONSENT OF THE ENGINEER. THE PROPER ELECTRONIC TRANSFER OF DATA SHALL BE THE USER'S RESPONSIBILITY WITHOUT LIABILITY TO THE ENGINEER. UNAUTHORIZED USE IS PROHIBITED.

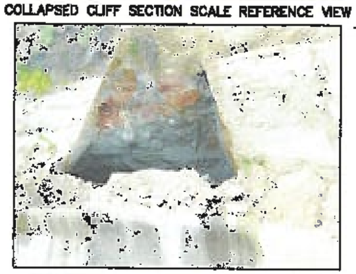
08/12/2017

APN [illegible] & 14 — [illegible]

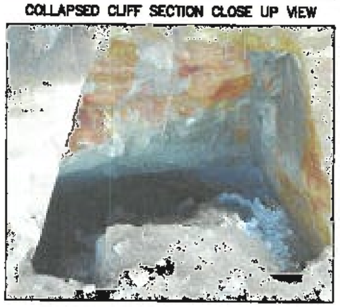
REVISED	AS BUILT PLAN 8/12/17		
BOWMAN & WILLIAMS CONSULTING CIVIL ENGINEERS [illegible] CEDAR STREET SANTA CRUZ, CA [illegible] (831) [illegible]		COVER 4640 & 4660 OPAL CLIFF DRIVE SANTA CRUZ, CALIFORNIA 95062	
SCALE 1" = 200'	DRAWN [illegible]	JOB NO. [illegible]	SHEET C1.1
DATE SEPT [illegible], 2017	CHECKED JAN	INDEX	OF 4
DESIGN [illegible]	DWG NAME EMERG PERMIT	FILE NO. [illegible]	

COLLAPSED CLIFF SECTION MACRO VIEW

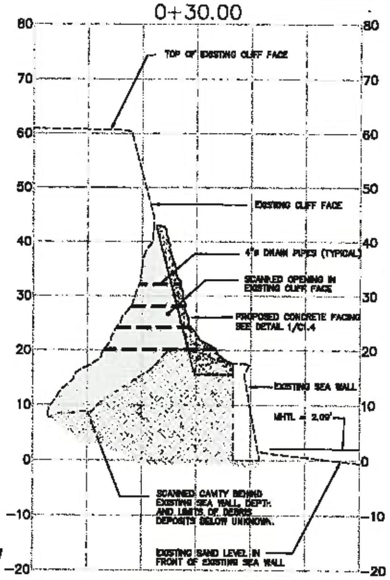
COLLAPSED CLIFF SECTION SCALE REFERENCE VIEW



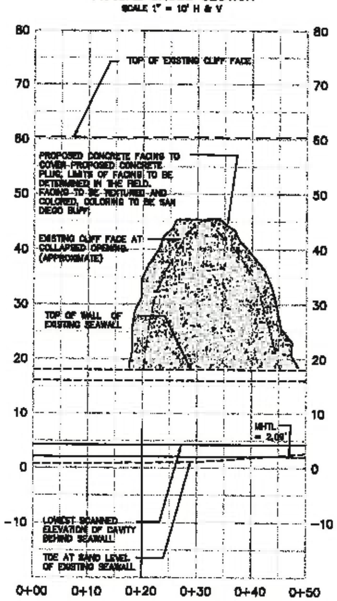
COLLAPSED CLIFF SECTION CLOSE UP VIEW



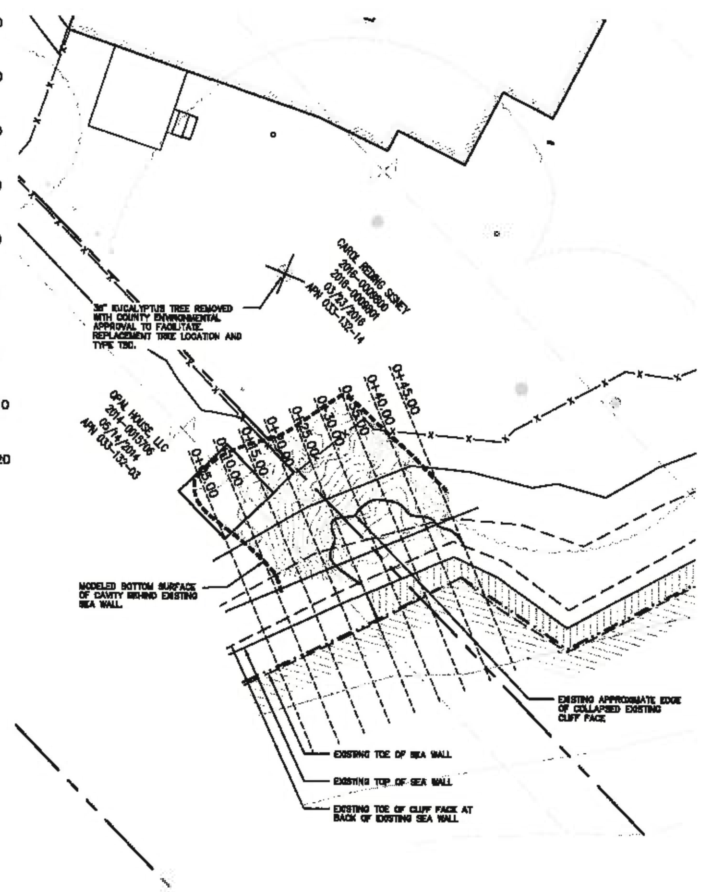
COLLAPSED CLIFF SECTION CAVE VIEW



TYPICAL CROSS SECTION
SCALE 1" = 10' H & V



FACE OF EXISTING SEAWALL SECTION
SCALE 1" = 10' H & V



COLLAPSED CLIFF SECTION ABOVE EXISTING SEA WALL
SCALE 1"=10'

CONCRETE FACING:

CONCRETE SHALL BE PROPORTIONED TO GIVE A 28 DAY COMPRESSIVE STRENGTH OF A LEAST 5000 PSI. THE SLUMP SHALL BE THE MINIMUM CONSISTENT WITH THE CONDITION OF PLACING BUT IN GENERAL SHALL NOT EXCEED 4 INCHES. ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH CHAPTER 19 OF THE CALIFORNIA BUILDING CODE, 2016 EDITION. IT IS RECOMMENDED THAT THE CONCRETE MIX DESIGNS INCORPORATE THE FOLLOWING REQUIREMENTS:

1. WATER TO CEMENT RATIO (W/C) SHALL NOT BE GREATER THAN 0.40
2. USE LOW-SHRINKAGE "GRANITE ROCK" AGGREGATES, WELL GRADED, 3/4" MAXIMUM SIZE AGGREGATE.
3. WATER TO BE CLEAN AND FREE OF DELETERIOUS AMOUNT OF ACID, ALKALIS, SALT, OILS AND ORGANIC SUBSTANCES.
4. USE KAISER TYPE II CEMENT.
5. USE BOTH FLY ASH (POZZOLON) AND SILICA FUME, APPROXIMATELY 8% ASH AND 4% FUME.
6. USE XYPEX C-1000 (3% BY WEIGHT OF CEMENT.)

REINFORCING BARS:

REINFORCING BARS SHALL BE DEFORMED BARS CONFORMING TO ASTM STANDARD SPECIFICATIONS A615-2003 GRADE #60 FOR #5 BARS AND LARGER. REINFORCING SHALL BE PLACED IN AS LONG LENGTHS AS POSSIBLE. BARS SHALL LAP 60 DIAMETER AT SPLICES UNLESS OTHERWISE SHOWN OR NOTED ON THE PLANS, USING DIAMETER OF THE LARGER BAR IN CASE OF THE DIFFERENCE IN SIZE. SPLICES SHALL BE STAGGERED AND BARS MAY BE WIRED TOGETHER AT SPLICES. BEND STEEL AROUND CORNERS 12" MINIMUM. ALL REINFORCING STEEL SHALL BE IN ACCORDANCE WITH CHAPTER 19 OF THE CALIFORNIA BUILDING CODE, 2016 EDITION. ALL REINFORCING STEEL TO BE EPOXY COATED. BAR COVERAGE (FACE OF BAR TO FACE OF CONCRETE) SHALL BE A MINIMUM OF 5" UNLESS NOTED OTHERWISE.

BAR SHALL HAVE BENDS AND HOOKS AS FOLLOWS EXCEPT AS OTHERWISE SHOWN OR NOTED.

4 x DIA. (TYP) — 2 x DIA. MIN. — 12 x DIA. MIN.

EPOXY ADHESIVE:

REINFORCING DOWELS SET IN SIMPSON SET-XP ADHESIVE PER ICBO REPORT NO. 2508, REISSUED JUNE 1, 2013 OR APPROVED EQUAL.

SPECIAL INSPECTIONS:

THE FOLLOWING SPECIAL INSPECTIONS, AS REQUIRED BY SECTION 1705 OF THE CALIFORNIA BUILDING CODE, 2016 EDITION, SHALL BE PROVIDED DURING CONSTRUCTION ON THE FOLLOWING TYPES OF WORK. THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR SUCH TESTS, INSPECTIONS AND APPROVALS WITH AN INDEPENDENT TESTING LABORATORY OR ENTITY ACCEPTABLE TO THE OWNER. THE OWNER SHALL BEAR COSTS OF THE TEST AND/OR INSPECTIONS.

A. CONCRETE FOR SEAWALLS AND POST INSTALLED ANCHORS, PER SECTION 1705.3 AND TABLE 1705.2.1

STRUCTURAL OBSERVATION:

DURING THE CONSTRUCTION THE OWNER SHALL EMPLOY THE STRUCTURAL ENGINEER RESPONSIBLE FOR THE STRUCTURAL DESIGN TO MAKE VISITS TO THE SITE TO OBSERVE GENERAL COMPLIANCE WITH THE APPROVED STRUCTURAL PLANS, SPECIFICATIONS AND CHANGE ORDERS. THE ENGINEER SHALL SUBMIT A STATEMENT IN WRITING TO THE BUILDING OFFICIAL STATING THE SITE VISITS HAVE BEEN MADE AND THAT ANY DEFICIENCIES NOTED HAVE BEEN CORRECTED.

NOTE:

ALL CONSTRUCTION NOT SPECIFICALLY DETAILED SHALL BE BUILT TO CONFORM WITH SIMILAR CONSTRUCTION SHOWN AND THE REQUIREMENTS OF THE CALIFORNIA BUILDING CODE, 2016 EDITION.

GRAPHIC SCALE
(IN FEET)
1 inch = 10 ft.

DISCLAIMER
THE DATA SET FORTH ON THIS SHEET IS THE PROPERTY OF BOWMAN & WILLIAMS CONSULTING CIVIL ENGINEERS. IT IS AN INSTRUMENT OF SERVICE AND MAY NOT BE REPRODUCED, ALTERED, OR USED WITHOUT THE CONSENT OF THE ENGINEER. THE PROPER ELECTRONIC TRANSFER OF DATA SHALL BE THE USER'S RESPONSIBILITY WITHOUT LIABILITY TO THE ENGINEER. UNAUTHORIZED USE IS PROHIBITED.

08/18/2017

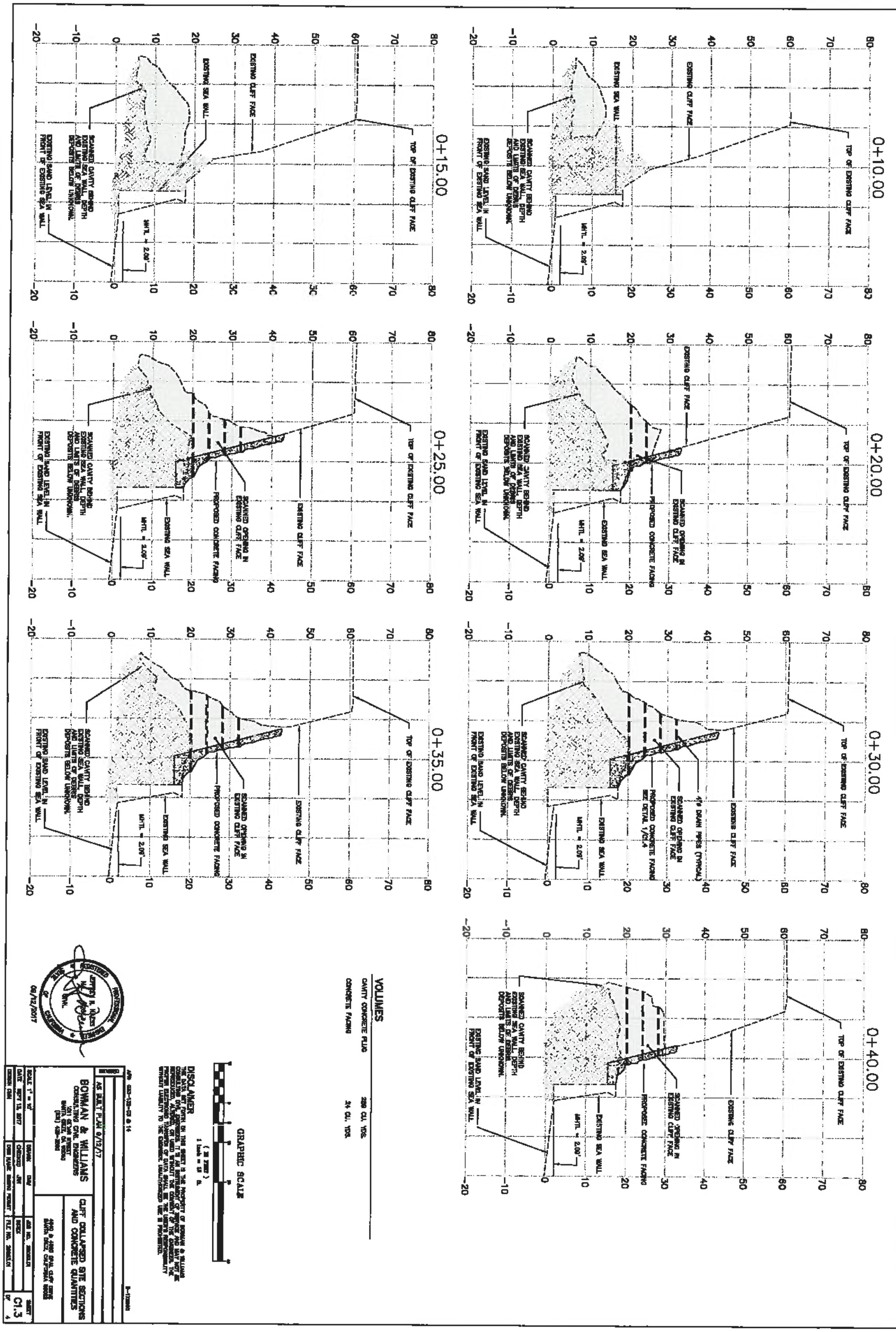
APN 033-132-03 & 14

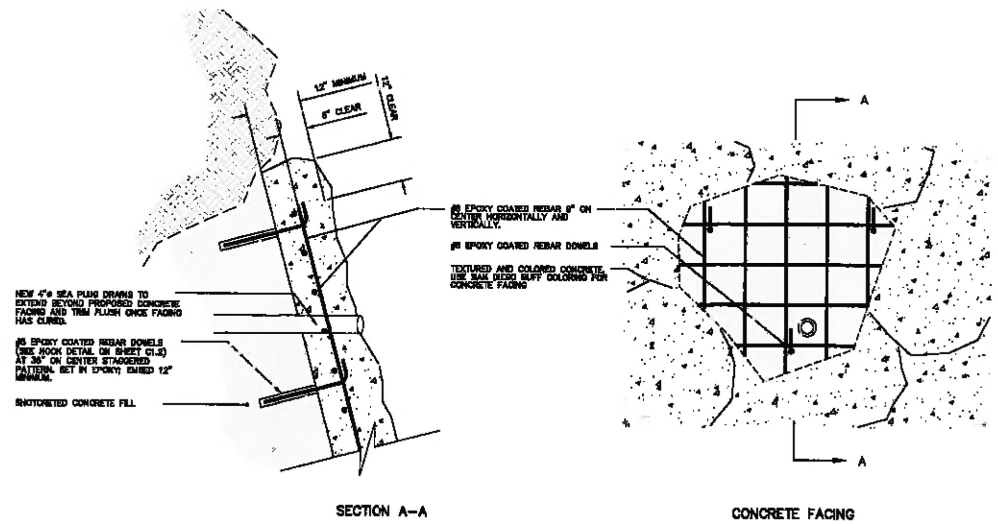
AS BUILT PLAN 9/12/17

BOWMAN & WILLIAMS
CONSULTING CIVIL ENGINEERS

COLLAPSED SECTION VIEWS AND PROPOSED PLUG AND FACING PLAN

SCALE 1" = 10'	DRAWN CAH	JOB NO. 26083.01	SHEET C1.2
DATE SEPT 12, 2017	CHECKED JAW	INDEX	
DESIGN CAH	DWG NAME EMERG PERMIT	FILE NO.	OF 4


0+10.00
0+15.00
0+20.00
0+25.00
0+30.00
0+35.00
0+40.00
TOP OF EXISTING CLIFF FACE
EXISTING CLIFF FACE
EXISTING SEA WALL
SCANNED CAVITY BEHIND EXISTING SEA WALL DEPTH AND LIMITS OF DEBRIS DEPOSITS BELOW UNKNOWN.
EXISTING SAND LEVEL IN FRONT OF EXISTING SEA WALL
PROPOSED CONCRETE FACING
SCANNED OPENING IN EXISTING CLIFF FACE
VOLUMES
CAVITY CONCRETE PLUG
CONCRETE FACING
GRAPHIC SCALE
DISCLAIMER
BOWMAN & WILLIAMS
CLIFF COLLAPSED SITE SECTIONS AND CONCRETE QUANTITIES
C1.3



1 / C1.4 **PROPOSED CONCRETE FACING DETAIL**

SCALE: NTS

DISCLAIMER

THE DATA SET FORTH ON THIS SHEET IS THE PROPERTY OF BOWMAN & WILLIAMS CONSULTING CIVIL ENGINEERS. IT IS AN INSTRUMENT OF SERVICE AND MAY NOT BE REPRODUCED, ALTERED, OR USED WITHOUT THE CONSENT OF THE ENGINEER. THE PROPER ELECTRONIC TRANSFER OF DATA SHALL BE THE USER'S RESPONSIBILITY WITHOUT LIABILITY TO THE ENGINEER. UNAUTHORIZED USE IS PROHIBITED.

09/12/2017

APN 033-132-03 & '4 — B-172995

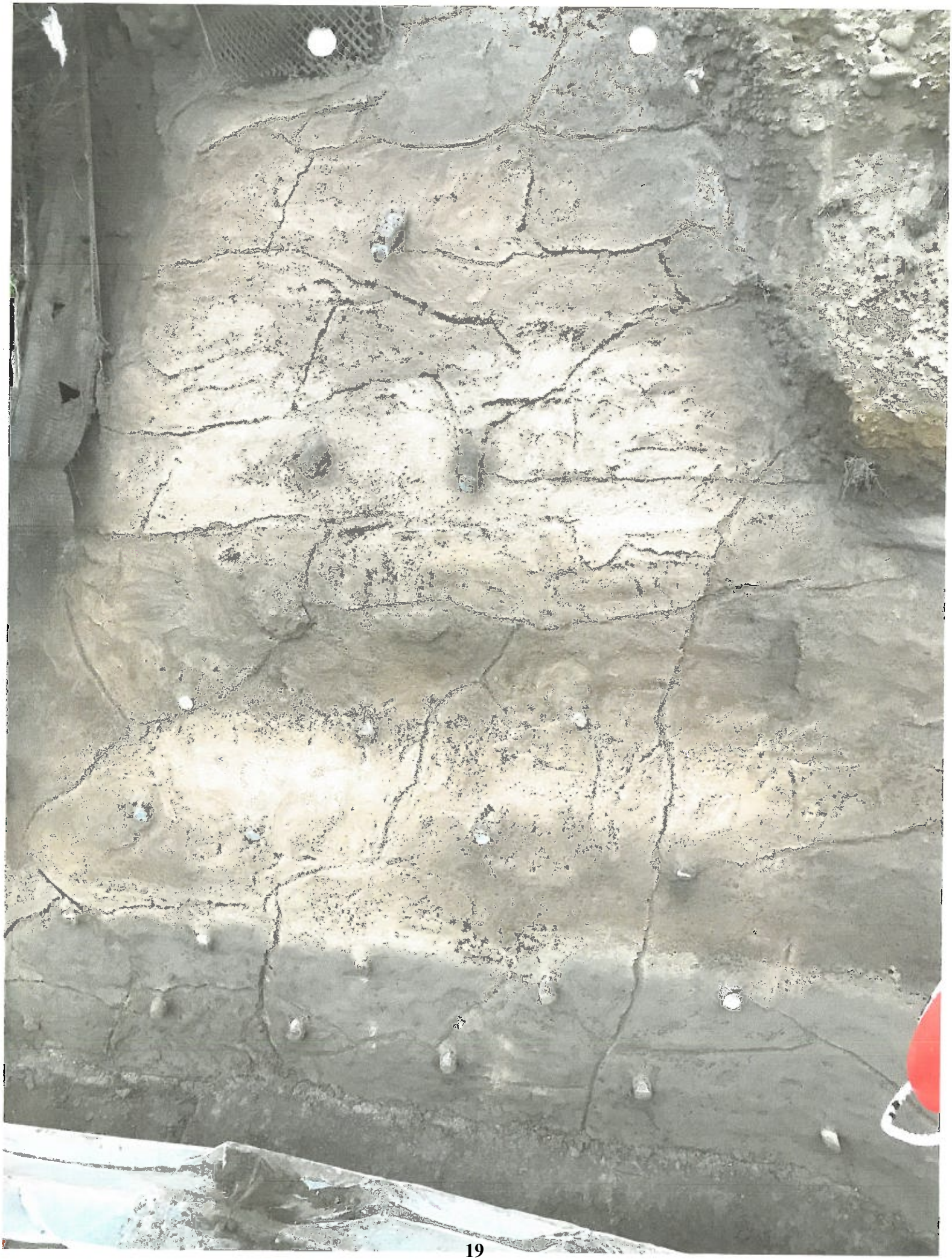
AS BUILT PLAN 9/12/17

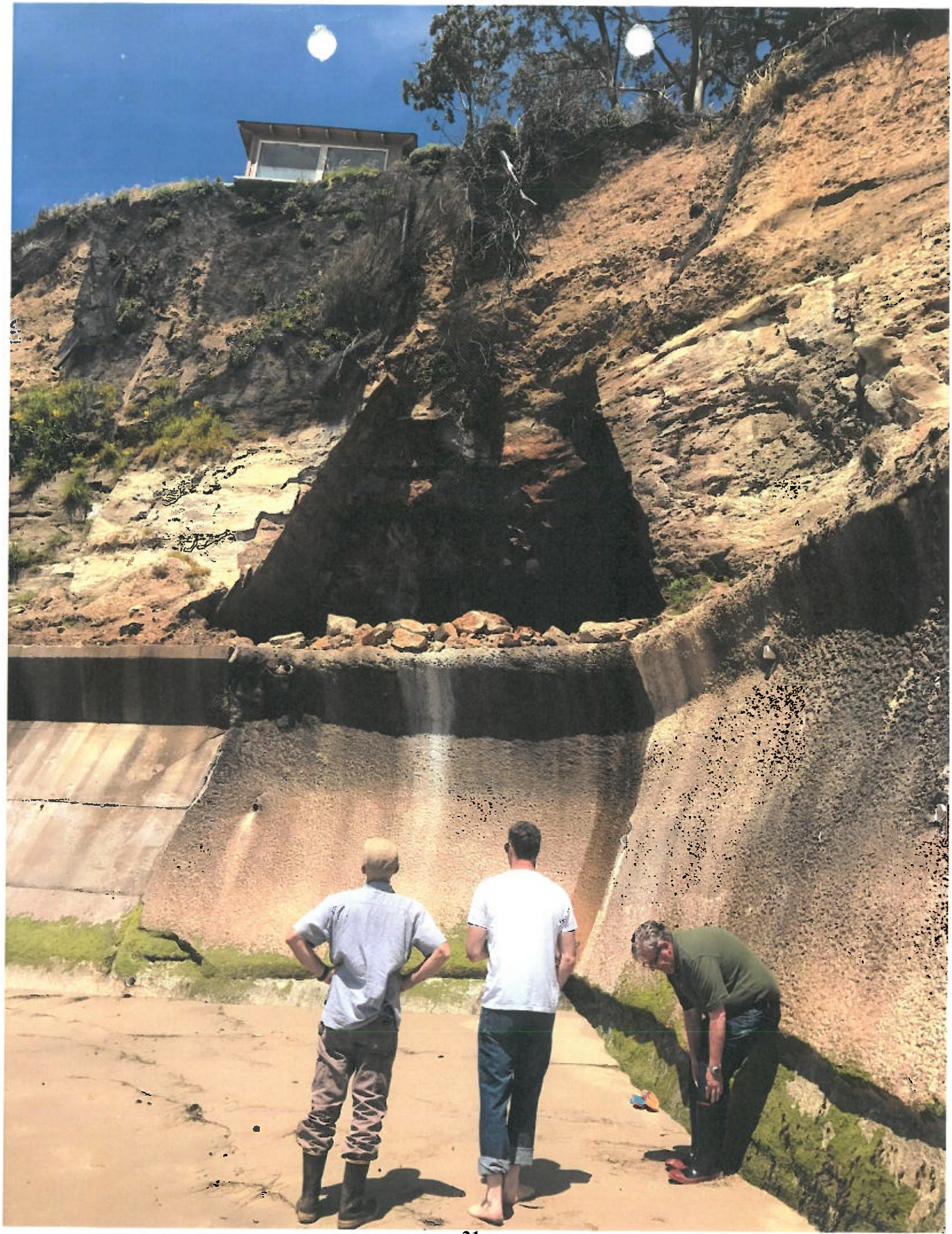
BOWMAN & WILLIAMS
CONSULTING CIVIL ENGINEERS
1011 CEDAR STREET
SANTA CRUZ, CA 95060
(831) 426-3560

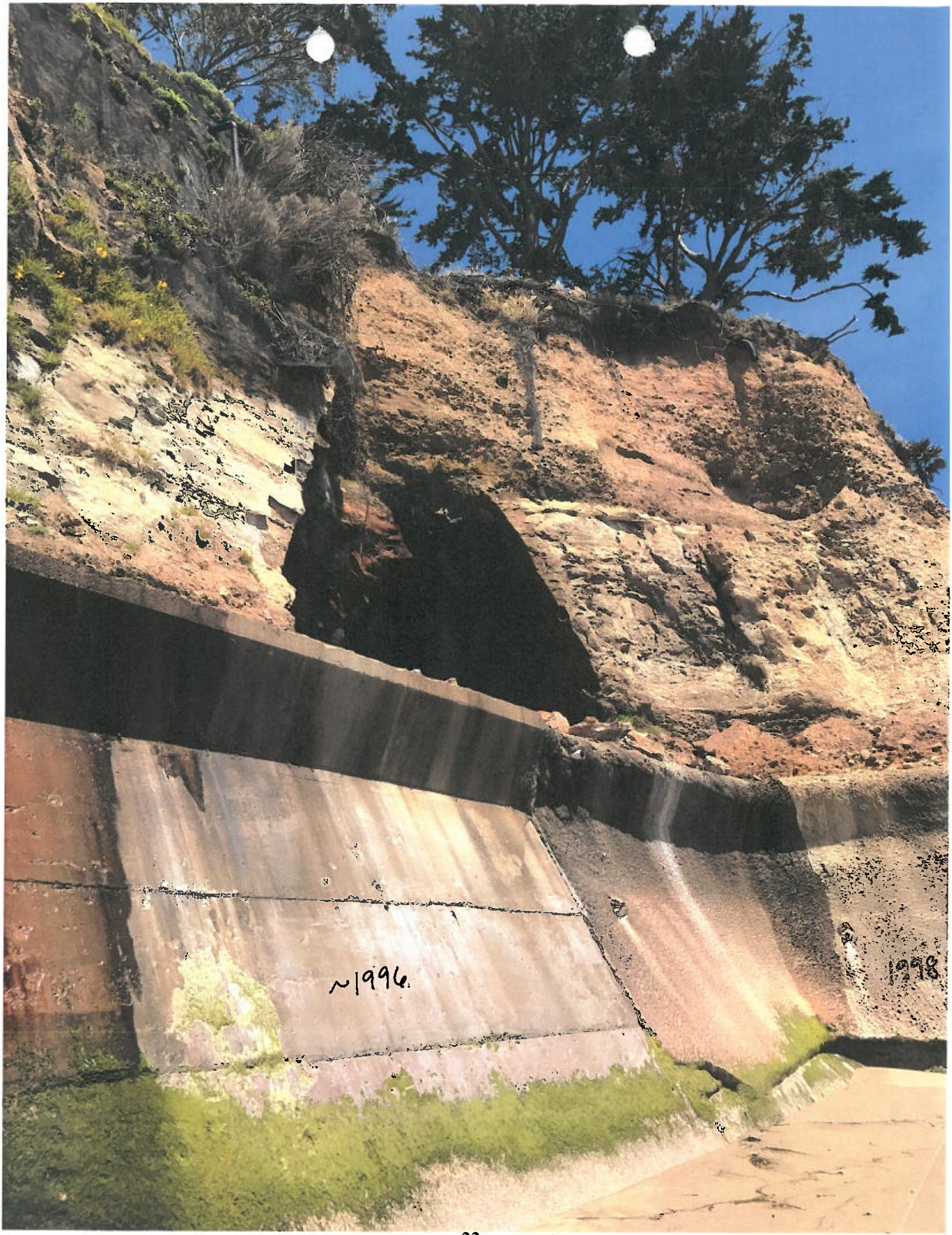
DETAILS

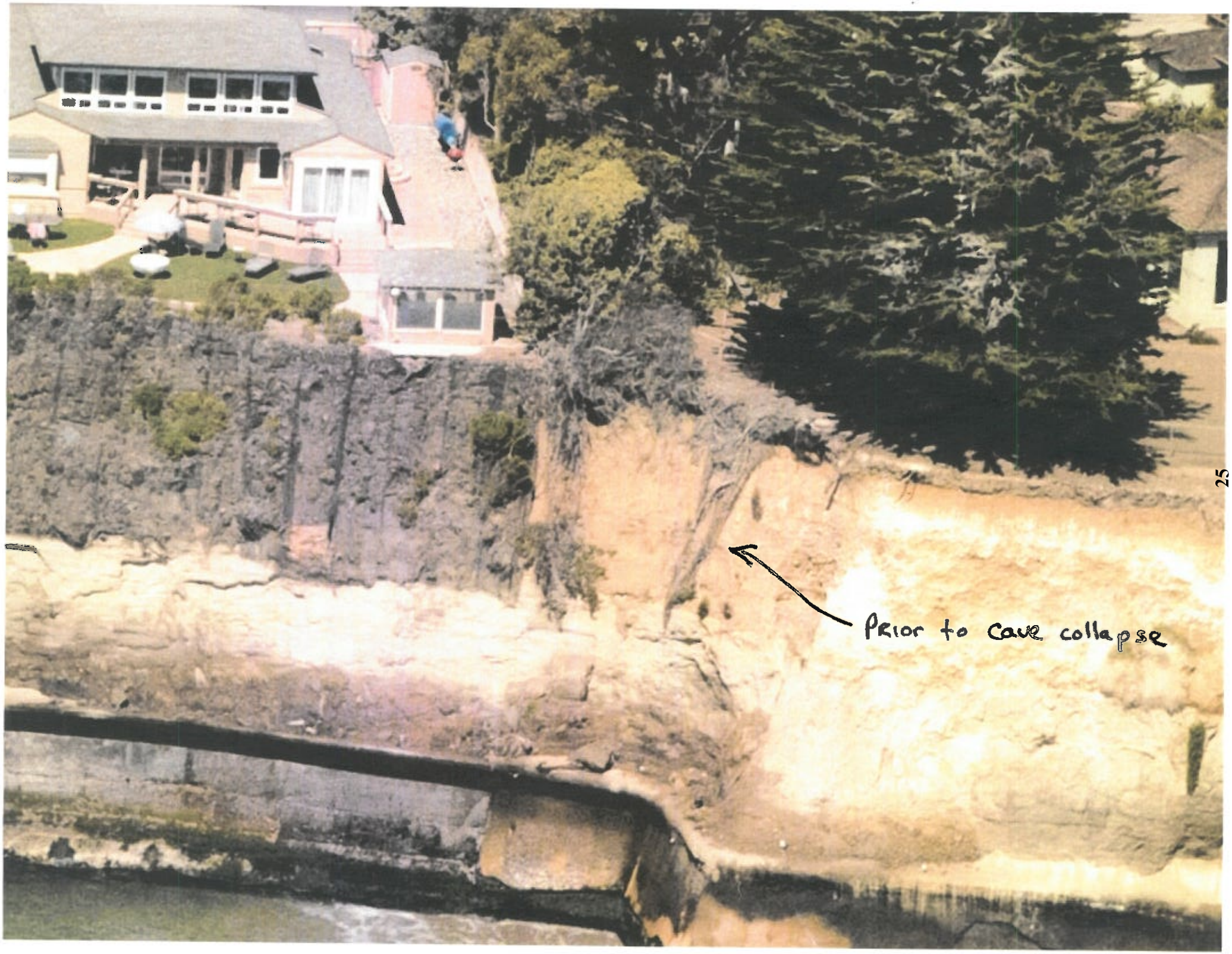
4540 & 4560 OPAL CLIFF DRIVE
SANTA CRUZ, CALIFORNIA 95062

SCALE AS SHOWN	DRAWN CMM	JOB NO. 26083.01	SHEET C1.4
DATE SEPT 12, 2017	CHECKED JRN	INDEX	
DESIGN CMM	DWG NAME EMERG PERMIT	FILE NO. 26083.01	OF 4






~1996.
1998


Prior to cave collapse

Easton Geology, Inc.
P.O. Box 3533, Santa Cruz, CA 95063
831.247.4317 info@eastongeology.com

4 January 2018

Jennifer Krach and Carol Sisney
4640 & 4660 Opal Cliff Drive
Santa Cruz, CA 95062

Job No. C17007

Re: Sand Loss Assessment for Recently
Stabilized Portion of Bluff
4640 and 4660 Opal Cliff Drive
Santa Cruz County APNs 033-132-03 and 14

Dear Mmes. Krach and Sisney:

At your request we have completed a sand loss assessment for the portion of the recently stabilized bluff above the existing seawalls which protect the base of the above-referenced coastal bluff. The stabilization project was authorized by the Santa Cruz County Planning Department under application No. B-172665 and consisted of plugging a collapsed seacave and constructing a shotcrete form to support the overhanging bluff resulting from the collapse. The stabilized portion of bluff will retain beach-quality sand and thus a loss of sand to the beach system. The purpose of this assessment is to quantify the amount of sand retained within the stabilized portion of bluff and estimate its replacement value. We have prepared this assessment in general accordance with Santa Cruz County code section 16.10.70(H)(3)(e) and California Coastal Commission guidelines.

Three factors which contribute to a loss of beach sand as a result of the placement of a shoreline protection structure are: 1) Encroachment on the Beach; 2) Fixing the Back Beach; and 3) Retention of Potential Beach Material. To this end we have calculated the volume of beach sand-sized material retained within the bluff-face as a result of the recent stabilization work. The recently completed seacave plug does not encroach onto, nor affect the fixing of the back beach at the site, thus this assessment does not consider these two factors.

Retention of Beach Material

Retention refers to the quantity of beach-quality material (larger than #80 sieve) retained within the bluff by the protective structure which would otherwise erode and contribute to the beach system. Although the base of the subject bluff will be protected by an existing seawall over the lifetime of the stabilized area, the unprotected bluff above the stabilization work will over time erode to a more stable configuration, and contribute some sand-sized material to the beach system. The volume of sand retained in the bluff as a result of the stabilization work is essentially the volume of sand-sized material that would erode from the bluff assuming no stabilization structure were in place, minus the volume of sand-sized material that will erode from the unprotected portion of the bluff above the structure.

Our sand loss calculation is an adaptation of our 100-year stability profile of the coastal bluff, which assumes a wedge-shaped erosional profile through the upper bluff. We utilized geologic

cross sections previously completed by our firm for both parcels, and profiles from the stabilization plans by Bowman & Williams, the project civil engineer and surveyor, for completing this assessment. The Santa Cruz County Planning Department assumes the lifetime of a coastal protection structure to be 50 years, and our calculations reflect this value.

The subject bluff is composed of Purisima Formation bedrock which comprises the lower 20 feet of the exposed bluff-face, and the overlying marine terrace deposits which are about 22 feet thick. The average width of the stabilized portion of the terrace deposits is 13.5 feet.

Recent analyses of the Purisima Formation upcoast and downcoast of the subject bluff indicate the formation locally contains between 10 and 25 percent sand-sized material (averaged to 17.5%). Analysis of the overlying marine terrace deposits indicates that they contain about 60% sand-sized material.

If the bluff-face were not stabilized, the volume of beach-quality sand that would erode from the bluff in 50 years would be about 38 yards, based on a 19.5 foot tall wedge of terrace material failing about13 feet back from the edge of the bluff. The unprotected portion of the terrace deposits above the stabilization structure will erode during the next 50 years and contribute about 24 yards of beach-quality material to the beach system, based on a wedge of terrace material 16.5 feet tall failing about 9.5 feet from the edge of the bluff. Subtracting the volume of sand that will erode from the unprotected portion of the bluff from the volume eroded if the bluff face were not stabilized equals the amount of beach-quality material retained by the stabilization structure during its 50-year lifetime: 38 – 24 = 14 yards of beach sand.

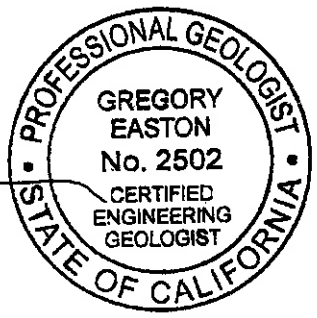
Bluff Retention of Beach Material: 14 yards

Based on recent quotes, beach-quality sand in the Santa Cruz County area runs $50 per yard, delivered. The cost of 14 yards of beach sand would be $700.

It has been a pleasure working with you. Please contact us if you have any questions pertaining to this project.

Sincerely,

EASTON GEOLOGY, INC.



Gregory Easton
Principal Geologist
C.E.G. No. 2502

Copies: addressees (1 and pdf)
Brett Brenkwitz (2 and pdf)

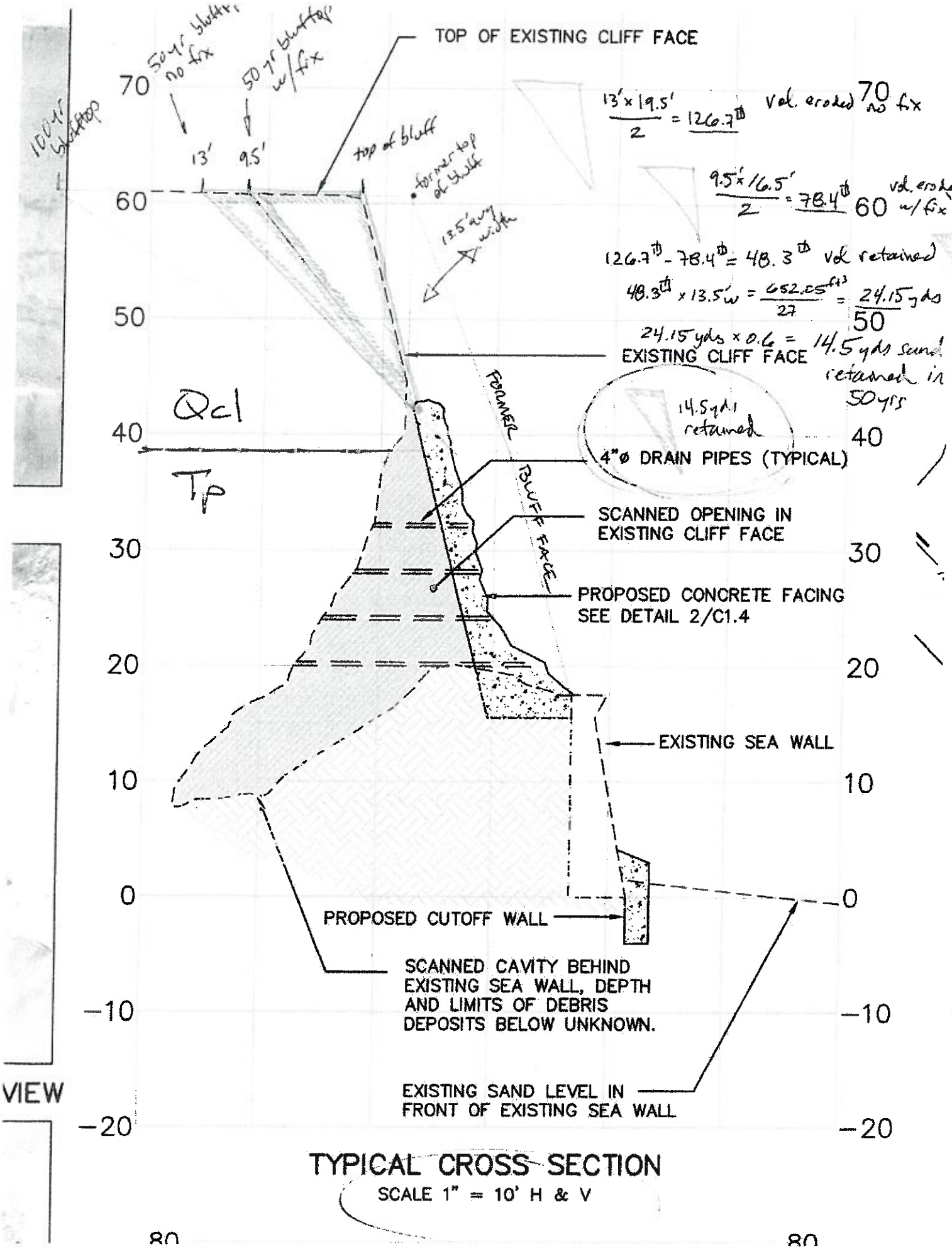
References:

Bowman & Williams, 2017, Jennifer Krach & Carol Sisney, Emergency Seawall Maintenance & Cliff Stabilization Plans, 4640 & 4660 Opal Cliff Drive, Santa Cruz, California, Job No. 26083.01, 4 sheets dated 18 May, 2017.

California Coastal Commission, 1997, Report on In-Liu Fee Beach Sand Mitigation Program: San Diego County, http://www.coastal.ca.gov/pgd/sand1.html#_Toc399043788 , accessed 2/19/17.

Easton Geology, 2017, Geologic Update, Krach Property, 4640 Opal Cliff Drive, Santa Cruz, California, Santa Cruz County APN 033-132-03, Job No. C17001, prepared 12 January 2017, 4p.

Easton Geology, 2017, Geologic Investigation, Sisney Property, 4660 Opal Cliff Drive, Santa Cruz, California, Santa Cruz County APNs 033-132-05, 06, 13, 14, Job No. C15023, prepared 25 January 2017, 41p, 2 plates.



TYPICAL CROSS SECTION

SCALE 1" = 10' H & V

Jessica deGrassi

From: Gregory Easton <greg@eastongeology.com>
Sent: Tuesday, February 20, 2018 5:28 PM
To: 'Graeven, Rainey@Coastal'
Cc: Jessica deGrassi
Subject: RE: Application No. 171261 (Krach & Sisney Bluff Repair)

Hello Rainey, thanks for your patience.

The total sand loss fee will vary depending on the type of sand specified (with the supplier's subject to periodic change), sales tax (which also changes), and the distance to the site. The suppliers don't include sales tax in their price per yard, and the delivery fee is likely a fixed amount (independent on yardage), but may also change with the federal mileage reimbursement rate. So, an exact price would appear to be somewhat nebulous.

The quote for $700 was for 14 yards of generic 'beach-quality sand', which from past experience runs about $50/yard. The discrepancy between 14 and 14.5 yards is likely due to rounding in the calculations. Sales tax rates went up recently, which increases cost, among other things.

A recent quote (2018) I received for 15 yards of 'Bunker Sand' from the Granite Rock sand plant is $880 delivered, plus tax. Their truck can haul 15 yards max, and the quote was for one truckload.

The current tax rate in Santa Cruz County is 9%; so 14 yards of sand is estimated to cost $890 delivered, tax included.

Hope this helps, please contact me if you have any additional questions.
Gregory Easton

EASTON GEOLOGY, INC.
P.O. Box 3533, Santa Cruz, CA 95063
greg@eastongeology.com
831.247.4317

From: Graeven, Rainey@Coastal [mailto:Rainey.Graeven@coastal.ca.gov]
Sent: Friday, February 09, 2018 4:15 PM
To: greg@eastongeology.com
Cc: Jessica deGrassi
Subject: Application No. 171261 (Krach & Sisney Bluff Repair)

Hi Greg,

Jessica sent over your letter regarding the sand supply calculation and the calculation sheet. It looks like per your letter 14 cubic yards equates to a $700 sand supply mitigation fee? I see that your calculation came to 14.5 cubic yards. Also, it looks like the $700 maybe did not include taxes and delivery costs? If my understanding is correct, would you be able to send over the total amount it would cost to deliver 14.5 cubic yards of sand including taxes and delivery fees?

Thanks,

Rainey Graeven
Coastal Program Analyst, Central Coast District
California Coastal Commission
725 Front Street, Santa Cruz, CA 95060

Project No.SC10959.2
4 December 2017
Revised: 2 January 2018

MR. BRET SISNEY
100 De Bernardo Lane
Aptos, California 95003

Subject: Coastal Bluff Retaining Wall Monitoring Maintenance Program

Reference: Upcoast End of Coastal Bluff
4660 Opal Cliff Drive
Capitola, California

Dear Mr. Sisney:

Between 22 June 2017 and 13 July 2017, Haro, Kasunich and Associates, Inc. (HKA) made observations during construction of the emergency repair of the bluff face at the project site. HKA has prepared this letter to outline the proposed monitoring and maintenance of this structure. The sea wall along the toe of the coastal bluff has become undermined and is in need of a cut off wall. The seawall repair will be done under a separate permit and monitoring maintenance agreement.

Our geotechnical recommendations for this project are summarized in letters dated 17 May 2017 and 9 June 2017. Our final letter for this project summarizing our observations is dated 2 August 2017. HKA worked closely with Easton Geology throughout this project. In brief a large portion of the coastal bluff face failed leaving a large cavity in the bluff. The cavity extended from the top of the seawall to nearly the top of the bluff with large fractured pieces of sandstone exposed over the beach below. The failure was infilled with reinforced structural concrete and faced with reinforced concrete art rock.

Following implementation of this Maintenance Plan and any future maintenance plan, the property owner(s) shall ensure that the condition and performance of the coastal bluff retaining wall and related development are regularly monitored, with inspections by qualified registered civil engineer with experience in coastal structures and processes. Monitoring inspections shall occur at least once every five (5) years, or after intense rain events such as those observed in 1983, 1998, and 2017, and or after evidence of visible significant damage due other circumstances. Such monitoring shall at a minimum address whether any significant weathering or damage has occurred that would adversely impact future performance, and identify any structural damage requiring repair in order to maintain the approved coastal bluff retaining wall in its approved state.

Monitoring reports prepared by a qualified registered civil engineer with experience in coastal structures and processes, and covering the above described evaluations, shall be submitted to the property owner(s) for review, as a minimum at five-year intervals, by September 1st of each fifth year (with the first report due by September 1, 2022, and subsequent reports due by September 1 of 2027, 2032, and so on) for as long as the coastal bluff wall exists at the property.

Reports should include pictures taken from same vantage point with survey rods to provide scale. Walking the top edge of the coastal bluff looking for signs of ground cracking. The wall should also be inspected up close by the engineer. To accomplish this rock climbing gear and the knowledge to use it will also be required of the inspecting engineer. The margins of the concrete structure should be examined for signs of out flanking. The presence of the existing seawall at the toe of the coastal bluff will be imperative to preventing undermining of the coastal bluff retaining wall structure. Therefore the seawall at the toe of the coastal bluff should also be inspected and maintained in accordance with the Recorded Monitoring and Maintenance Program Pursuant To Grading and Development Permit No. 95-0621.

Should you have any questions please contact our office.

Respectfully submitted,

HARO, KASUNICH & ASSOCIATES, INC.

Moses E. Cuprill, P.E.
C.E. 78904

MC/mc
Copies: pdf: Bret Sisney bsisney@devcon-const.com
Brett Brenkwitz brenkwitz@sbcglobal.net
Jeff Naess jeff@bowmanandwilliams.com
Gregory Easton greg@eastongeology.com

BOWMAN & WILLIAMS
CONSULTING CIVIL ENGINEERS
A CALIFORNIA CORPORATION
1011 CEDAR • PO BOX 1621 • SANTA CRUZ, CA 95061-1621
PHONE (831) 426-3560 FAX (831) 426-9182 www.bowmanandwilliams.com

August 15, 2017

Santa Cruz County Planning Department
701 Ocean Street
Santa Cruz, CA 95060

Re: Krach/Sisney Emergency Seawall Maintenance & Cliff Stabilization Plan
4640 & 4660 Opal Cliff Drive, Our File No. 26083.01

To Whom it May Concern;

Our firm visited the Krach/Sisney project on July 13, 2017 to inspect the final installation of the Emergency Seawall Maintenance & Cliff Stabilization work. We found that the improvements constructed were in "General Conformance" with the plans prepared by our office entitled "Jennifer Krach & Carol Sisney, Emergency Seawall Maintenance & Cliff Stabilization Plans", dated May 18, 2017 with latest revision dated June 8, 2017.

Please feel free to call our office should you have any questions regarding the information provided above.

Sincerely,
Bowman & Williams

Jeffrey R. Naess
Principal Engineer

SC10959.2
2 August 2017

BRET SISNEY
100 De Bernardo Lane
Aptos, California
95003

Subject: Geotechnical Final Letter

Reference: Emergency Sea Cave and Bluff Face Repair
4660 Opal Cliff Drive
Capitola, California
Emergency Permit Number 172665

Dear Mr. Sisney:

Haro, Kasunich and Associates, Inc. (HKA) has prepared this letter to summarize our geotechnical observations made for the referenced project. Between 22 June 2017 and 13 July 2017 HKA visited the site on an intermittent basis to make observations during construction of the emergency repair of the bluff face at the project site. Our geotechnical recommendations for this project are summarized in letters dated 17 May 2017 and 9 June 2017. In brief a sea cave formed resulting in bluff face collapse. HKA recommended stabilizing the cave and bluff face.

The sea cave and bluff face were infilled with a colored concrete mixture in 3 to 5 foot lifts. Epoxy coated rebar was placed perpendicular to the face approximately every 3 vertical feet. A total of 7 lifts of concrete were placed during this repair. Care was taken in the first lift to use a lower slump concrete to prevent seepage of concrete materials below the sea wall. After the mass concrete placement was complete an epoxy coated reinforcing steel cage was placed at the face and dowelled into the mass concrete. An art rock concrete was shot over the face of the mass concrete stabilizing plug.

Once the cave and bluff face were stabilized a mini-excavator was lifted onto the beach during a negative low tide to excavate exploratory pits along the toe of the sea wall. Present during this work was representatives from the County of Santa Cruz Environmental Planning Department. The findings of this work will be summarize in a separate letter addressing the recommended future maintenance of the sea wall.

Based on our observations made during this report period the mass concrete plug and facing were constructed using good workmanship and careful

consideration to the surrounding coastal resources. The mass concrete stabilizing plug for the subject sea cave and bluff face repair have been constructed in conformance with our geotechnical recommendations for this project.

We appreciate this opportunity to be of service to you on this project. If you have any questions or comments regarding this or anything else please contact our office.

Respectfully submitted,

HARO, KASUNICH & ASSOCIATES, INC.

Moses E. Cuprill, P.E.
C.E. 78904

MC/mc
Copies: pdf: Bret Sisney bsisney@devcon-const.com
Brett Brenkwitz brenkwitz@sbcglobal.net
Jeff Naess jeff@bowmanandwilliams.com
Gregory Easton greg@eastongeology.com

116 EAST LAKE AVENUE • WATSONVILLE, CALIFORNIA 95076 • (831) 722-4175 • FAX (831) 722-3202

Easton Geology, Inc.
P.O. Box 3533, Santa Cruz, CA 95063
831.247.4317 info@eastongeology.com

31 July 2017

Jennifer Krach and Carol Sisney
4640 & 4660 Opal Cliff Drive
Santa Cruz, CA 95062

Job No. C17007

Re: Inspection of Stabilized Seacave and Bluff-face
4640 and 4660 Opal Cliff Drive
Santa Cruz County APNs 033-132-03 & 14
Emergency Permit No. B-172665

Dear Mmes. Krach and Sisney:

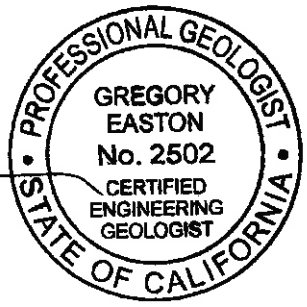
As required by the Santa Cruz County Planning Department, we have inspected the completed first phase of emergency seacave and bluff-face stabilization work for the above-referenced properties. The stabilization measures completed to date are consistent with project plans by Bowman & Williams (2017) and are geologically acceptable.

Prior to approval of the emergency permit for the above work, the project was separated into phases, with the first phase pertaining to the plugging of the seacave and supporting the overhanging bluff-face. The second phase will entail infilling and supporting the undermined portion of the seawall fronting the plugged cave. We recently examined the extent of undermining of the seawall fronting the plugged cave and a letter describing our findings is forthcoming. These findings should be taken into consideration for the proposed maintenance to the undermined seawall.

We recommend regular inspection of the completed stabilization measures. If any unanticipated changes are noted in the area of the stabilized cave and bluff-face, we should be notified immediately. The drains within the structurally supported bluff-face should be kept clear and free-flowing.

Please contact us if you have any questions regarding this project, thank you.

Sincerely,
EASTON GEOLOGY, INC.



Gregory Easton
Principal Geologist
C.E.G. No. 2502

Reference:

Bowman & Williams, 2017, Jennifer Krach & Carol Sisney, Emergency Seawall Maintenance & Cliff Stabilization Plans, 4640 & 4660 Opal Cliff Drive, Santa Cruz, California, Job No. 26083.01, 4 sheets dated 18 May, 2017.

Project No. SC10959
9 June 2017

MR. BRETT BRENKWITZ
P. O. Box 597
Aptos, CA 95001

Subject: Geotechnical Plan Review

Reference: Emergency Seawall Maintenance & Cliff Stabilization
4640 & 4660 Opal Cliff
Santa Cruz County, California

Dear Mr. Brenkwitz:

As requested, we have reviewed the geotechnical aspects of the Emergency Seawall Maintenance Plan for the referenced project. Our Geotechnical Letters for the project are dated 17 May and 5 June 2017. The reviewed plan sheets are Sheets C1.1, C1.2 and C1.3, revised 8 June 2017, prepared by Bowman & Williams Consulting Civil Engineers.

The plans indicate a two phase maintenance construction sequence will be done: Bluff Repair behind and above the existing seawall (Phase 1) and cut off wall construction at the base of the seawall during a minus tide cycle (Phase 2).

Based on our review, the geotechnical aspects of the referenced Emergency Seawall Maintenance and Cliff Stabilization plans are in compliance with our geotechnical recommendations. If you have questions concerning this letter, please contact our office.

Respectfully Submitted,

HARO, KASUNICH AND ASSOCIATES, INC.

John E. Kasunich
G.E. 455

CG/dk

Copies: 3 to Addressee

COUNTY OF SANTA CRUZ

PLANNING DEPARTMENT
701 OCEAN STREET, 4TH FLOOR, SANTA CRUZ, CA 95060
(831) 454-2580 FAX: (831) 454-2131 TDD: (831) 454-2123
KATHLEEN MOLLOY PREVISICH, PLANNING DIRECTOR

6 June 2017

Jennifer Krach
PO Box 10195
Palo Alto, CA 94303

Subject: Review of the Emergency Seawall Maintenance and Bluff Stabilization – 4640 and 4660 Opal Cliff Drive letter dated 17 May 2017 by Easton Geology Inc. – Job No. C17007

Review of the Emergency Sea Wall Maintenance – Construction Sequence – 4660 Opal Cliff Drive dated 5 June 2017 by Haro, Kasunich and Associates - Project No. 10959.2

Project Site: 4640-4660 Opal Cliff Drive
APNs 033-132-03 & 033-132-14
Application No: B-172665

Dear Applicant:

The purpose of this letter is to inform you that the Planning Department has accepted the subject reports and the following items shall be required:

1. All project design and construction shall comply with the recommendations of the reports.

2. Final plans shall reference the reports by titles, authors, and dates. Final Plans should also include a statement that the project shall conform to the reports' recommendations.

3. After plans are prepared that are acceptable to all reviewing agencies, please submit a completed Soils (Geotechnical) Engineer Plan Review Form and a completed Geologist Plan Review Form to Environmental Planning. The authors of the soils and geology reports shall sign and stamp their respective completed forms. Please note that the plan review forms must reference the final plan set by last revision date.

Any updates to report recommendations necessary to address conflicts between the reports and plans must be provided via a separate addendum to the soils report and/or geology report.

Electronic copies of all forms required to be completed by the Geotechnical Engineer may be found on our website: www.sccoplanning.com, under "Environmental", "Geology & Soils", and "Assistance & Forms".

After building permit issuance the soils engineer and engineering geologist *must remain involved with the project* during construction. Please review the Notice to Permits Holders (attached).

Our acceptance of the reports is limited to its technical content. Other project issues such as zoning, fire safety, septic or sewer approval, etc. may require resolution by other agencies.

Please note that this determination may be appealed within 14 calendar days of the date of service. Additional information regarding the appeals process may be found online at: http://www.sccoplanning.com/html/devrev/plnappeal_bldg.htm

Please contact Rick Parks at (831) 454-3168/email: Rick.Parks@santacruzcounty.us or Joe Hanna at (831) 454-3175/Joseph.Hanna@santacruzcounty.us if we can be of any further assistance.

Sincerely,

Rick Parks, GE 2603
Civil Engineer – Environmental Planning
County of Santa Cruz Planning Department

Joseph Hanna, CEG 1313
County Geologist– Environmental Planning
County of Santa Cruz Planning Department

Cc: Carol Sisney
Haro, Kasunich and Associates, Attn: John Kasunich, GE
Easton Geology, Attn: Greg Easton, CEG

Attachments: Notice to Permit Holders

NOTICE TO PERMIT HOLDERS WHEN SOILS AND GEOLOGY REPORTS HAVE BEEN PREPARED, REVIEWED AND ACCEPTED FOR THE PROJECT

After issuance of the building permit, the County requires your soils engineer and engineering geologist to be involved during construction.

1. **At the completion of construction,** a *Soils (Geotechnical) Engineer Final Inspection Form* and a *Geologist Final Inspection Form* are required to be submitted to Environmental Planning that includes copies of all observations made during construction and is stamped and signed, certifying that the project was constructed in conformance with the recommendations of the soils and geology reports.

   If the *Final Inspection Form* identifies any portions of the project that were not observed by the soils engineer and/or geologist, you may be required to perform destructive testing in order for your permit to obtain a final inspection. The soils engineer and/or geologist then must complete and initial an *Exceptions Addendum Form* that certifies that the features not observed will not pose a life safety risk to occupants.

Project No.SC10959.2
5 June 2017

MR. JOE HANNA
Santa Cruz County Planning Department
701 Ocean Street, Room
Santa Cruz, California 95060

Subject: Emergency Sea Wall Maintenance
Construction Sequence

Reference: Upcoast End of Sea Wall
4660 Opal Cliff Drive
Santa Cruz County, California

Dear Mr. Hanna:

Haro, Kasunich and Associates, Inc. (HKA) prepared an emergency seawall maintenance recommendation letter dated 17 May 2017 for the reference property. That letter described recent bluff failure that included large blocks of Purisima sandstone and overlying terrace deposits failing and causing a large cavity behind an existing seawall at the base of the bluff. Prior observations at the base of the seawall during winter sand scour conditions indicates the seawall is undermined in places. This undermining probably contributed to the recent bluff collapse and resultant void that now exists behind the seawall. The seawall will continue to be undermined and its loss of passive resistance to wave impact forces due to the newly formed cavity requires the following immediate action:

1. The cavity should be filled immediately. At present beach sand covers the base of the wall and undermining of the wall is infilled with this higher elevation beach sand.

2. The void behind the wall should be infilled from above to the existing grade of the natural bluff above the seawall. This should be done above the seawall with no personel working on the beach at the base of the seawall.

3. After the void has been infilled, a backhoe should be lowered to the beach and the beach sand excavated to inspect the base of the seawall and determine the depth and extent of the undermine condition.

4. The identified undermining should then be rectified with a cutoff wall dug deep into the underlying Purisima sandstone. An embedment depth of 6

feet should be a preliminary consideration for the cutoff wall depth.

5. Structural evaluations of these emergency recommendations should follow the geotechnical recommendations presented in our 17 May 2017 letter.

6. The mobilization and construction requirements to infill the void created by the bluff collapse above and behind the seawall will entail crane work to lower equipment and materials and to allow a man-basket and labor to infill the cavity. The crane(s) should be situated on the bluff top in a manner to preserve the two trees located at the top edge of the bluff. The trees should be evaluated and pruned where necessary to accommodate crane work but should not be damaged nor cut down. Devcon's (Bret Sisney), safety officer will be working with crane operators to determine proper mobilize and safe location at the top of the bluff for the emergency repair work.

7. The emergency work should begin as soon as possible to take advantage of the next low tide cycle that will allow exploration at the base of the seawall and construction of a cutoff wall.

8. The Coastal Commission will have to be notified and involved in the exploration at the base of seawall, the cutoff wall evaluation and its construction as part of a Phase 2, emergency permit.

If you have any questions, please call our office.

Respectfully submitted,

HARO, KASUNICH & ASSOCIATES, INC.

John E. Kasunich, P.E.
G.E. 455

REGISTERED PROFESSIONAL ENGINEER
JOHN E. KASUNICH
No. 455
Exp. 6/18
GEOTECHNICAL
STATE OF CALIFORNIA

JEK/sr
Copies: 2 to Addressee + pdf Joseph.Hanna@santacruzcounty.us
1 to Rick Parks pdf only Rick.Parks@santacruzcounty.us
1 to Jessica Duktig pdf only Jessica.Duktig@santacruzcounty.us
1 to Bret Sisney c/o Brett Brenkwitz + pdf brenkwitz@sbcglobal.net

Project No.SC10959
17 May 2017

MR. BRET SISNEY
100 De Bernardo Lane
Aptos, California 95003

Subject: Emergency Sea Wall Maintenance

Reference: Upcoast End of Sea Wall
4660 Opal Cliff Drive
Capitola, California

Dear Mr. Sisney:

Haro, Kasunich and Associates, Inc. (HKA) has prepared this letter to summarize the recent bluff failure, its impact on the performance of the sea wall below it, and recommendations for emergency maintenance. A large cavity formed behind and above the up coast side of the seawall and recently a large portion of the bluff caved into the cavity. The bluff failure included large blocks of Purisima Sandstone and the overlying coastal terrace deposits. The material collapsed into the cavity creating a large pile of rubble and soil. A majority of the cavity is still vacant. The bluff failure left behind an over steepened unstable head scarp.

The formation of the cavity is unknown to HKA at this time. Based on observations made in 2016 during a period of scoured sand deposit this portion of the wall might be undermined. If the wall is actually undermined when sand scours out in the future it will allow for seawater to enter below the seawall further enlarging the cavity. The formation of a cavity behind the seawall results in loss of passive earth resistance to wave impact forces.

The seawall should be maintenance as soon as possible by infilling with concrete grout to restore the passive resistance behind the seawall in this location. It is not safe to remove the pile of rubble and soil at the base of the cavity therefore it should remain in place and the grout be placed around it. Permeable grout should be injected into the bottom of the cavity to fill in voids and create a solidified base to support the concrete grout backfill.

If the seawall is actually undermined it will be imperative to the success of this maintenance to seal the void under the wall to prevent further erosion and undermining. This will require construction of a cutoff wall along the toe of the seawall. It looks like a cutoff wall would be located seaward of the mean high tide line. To determine whether or not the seawall has been undermined in this

location test pits should be excavated along the toe of the seawall using an excavator. The soonest this exploratory pit can be excavated would be Sunday 25 June 2017 or Monday 26 June 2017 during negative tides (-1.6 to -1.4) between 6 and 7 am. The permeable grouting as part of the plugging of the cavity may solidify sand deposits under the wall and eliminate the need for a cutoff wall. However if it is determined by backhoe test pits that a cutoff wall is necessary to secure the backfill in this location the exploratory trench along the toe of the seawall should be used to construct the cutoff wall. This will minimize impact to coastal resources as well efficiently use the limited access time during negative tides in daylight hours for construction. Exploration at the toe of the seawall is not safe at this time. The cavity should be infilled with concrete grout and the head scarp above it buttressed prior to exploratory work commencing at the base of the seawall in this location. Buttressing the head scarp will also protect and preserve the lateral boundaries of the bluff top failure.

HKA offers the following recommendations for design and construction of the cavity plug and head scarp buttress.

1. The cavity behind the sea wall should be infilled with a concrete grout mixture.

2. The base of the cavity should be injected with permeable grout to attempt to fill in voids and create a firm base to support the backfill.

3. For safety concerns the head scarp should be buttressed with a mass of concrete grout and or tie-backs (if needed) prior to exploratory work commencing at the toe of the seawall in this location.

4. If exploratory work determines that the wall is undermined in this location the exploratory trench should be utilized to construct a cutoff wall while tidal access permits.

5. An active earth pressure of 40 pcf equivalent fluid weight (EFW) should be applied to the landward side of the plug and cutoff wall.

6. An allowable bearing capacity of 10,000 psf should be used for support of the backfill plug. This value assumes that if the seawall has become undermined it will be secured by either permeable grouting or a cutoff wall.

7. For resistance to sliding a coefficient of friction equal to 0.40 should be applied to the base of the plug.

116 EAST LAKE AVENUE • WATSONVILLE, CALIFORNIA 95076 • (831) 722-4175 • FAX (831) 722-3202

8. For skin friction of grouted tiebacks an allowable friction value of 2,800 psf should be applied to the surface of the grouted portion of the tieback.

9. Tie-backs should be 6 inches in diameter with a minimum un-bonded length of 15 feet and minimum bonded length of 15 feet.

10. Tiebacks should be installed between 15 to 20 degrees below an imaginary horizontal plane.

11. HKA should be on-site during maintenance operations to observe, document, and provide consultation as work progresses.

We appreciate this opportunity to be of service to you on this project. If you have any questions or comments please contact our office.

Respectfully submitted,

HARO, KASUNICH & ASSOCIATES, INC.

REGISTERED PROFESSIONAL ENGINEER
JOHN E. KASUNICH
No. 455
Exp 6/18
GEOTECHNICAL
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
MOSES E. CUPRILL
No. 78904
Exp. 3/18
CIVIL
STATE OF CALIFORNIA

John E. Kasunich, P.E.
G.E. 455

Moses E. Cuprill, P.E.
C.E. 78904

MC/jk/mc
Copies: pdf: Bret Sisney bsisney@devcon-const.com
Brett Brenkwitz brenkwitz@sbcglobal.net
Jeff Naess jeff@bowmanandwilliams.com
Gregory Easton greg@eastongeology.com

Easton Geology, Inc.
P.O. Box 3533, Santa Cruz, CA 95063
831.247.4317 info@eastongeology.com

18 May 2017

Jennifer Krach and Carol Sisney
4640 & 4660 Opal Cliff Drive
Santa Cruz, CA 95062

Job No. C17007

Re: Emergency Seawall Maintenance
and Bluff Stabilization
4640 and 4660 Opal Cliff Drive
Santa Cruz County APNs 033-132-03 & 14

Dear Mmes. Krach and Sisney:

The purpose of this letter is to inform you, the project professionals, and the regulatory agencies which govern permitting for the above-referenced coastal properties, of an emergency condition stemming from the unexpected collapse of a large seacave behind the seawall system at the base of the subject bluff.

The collapse occurred behind the junction of two seawalls. The upcoast (Krach) seawall was constructed in 1994 and the downcoast seawall (Sisney) in 1998. The walls were constructed across a large undercut or seacave at the base of the bluff. We surmise that with time the seawalls became undermined and wave action scoured the cave infill and possibly enlarged the cave behind the walls. A deepened footing was completed for the Krach wall in 2009, which effectively abated scour occurring from beneath the Krach wall. However, unmitigated scour from beneath the Sisney wall continued. On or in the days prior to 20 April 2017, the roof of the cave collapsed, causing a failure of the overlying bedrock and terrace deposits comprising the subject bluff.

The recent collapse has created an unstable, overhanging section of bluff above the seawalls. Because of the rubble now filling the collapse area and the hazard of continued collapse, the extent of the cave is unknown. From a laser survey of the collapse area performed by the project civil engineer, we estimate that the cave extends at least 35 feet beneath the bluff. Failure of the overhanging bedrock and terrace deposits could severely damage the seawalls and would result in significant, instantaneous retreat of the blufftop. Unless mitigated, the bluff and improvements atop the bluff above the cave area are at risk from collapse. This hazard also poses a risk to beachgoers below.

We have met with the project consultants on several occasions to discuss the remediation of the seacave and undermined seawall, and stabilization of the overhanging bluff. From our discussions, the project civil engineer has prepared plans which detail the proposed mitigation. The plans, prepared by Bowman & Williams, depict the cave being plugged with concrete and injection grouted to permeate the void space within and around the rubble. A shotcreted structural form will extend above the plugged cave and seawall to support the overhanging bluff. A deepened footing will be constructed along the base of the undermined Sisney wall to help prevent further erosion beneath and behind the seawalls.

The proposed stabilization plans are geologically acceptable provided the improvements are properly constructed. We must inspect the construction of the cave plug and bluff-face support, as well as the excavation for the deepened seawall footing prior to installation of any rebar and shotcrete.

Given the existing conditions at the site, it is our opinion that the proposed mitigation should be performed as soon as possible under an emergency permit.

Sincerely,
EASTON GEOLOGY, INC.

Gregory Easton
Principal Geologist
C.E.G. No. 2502

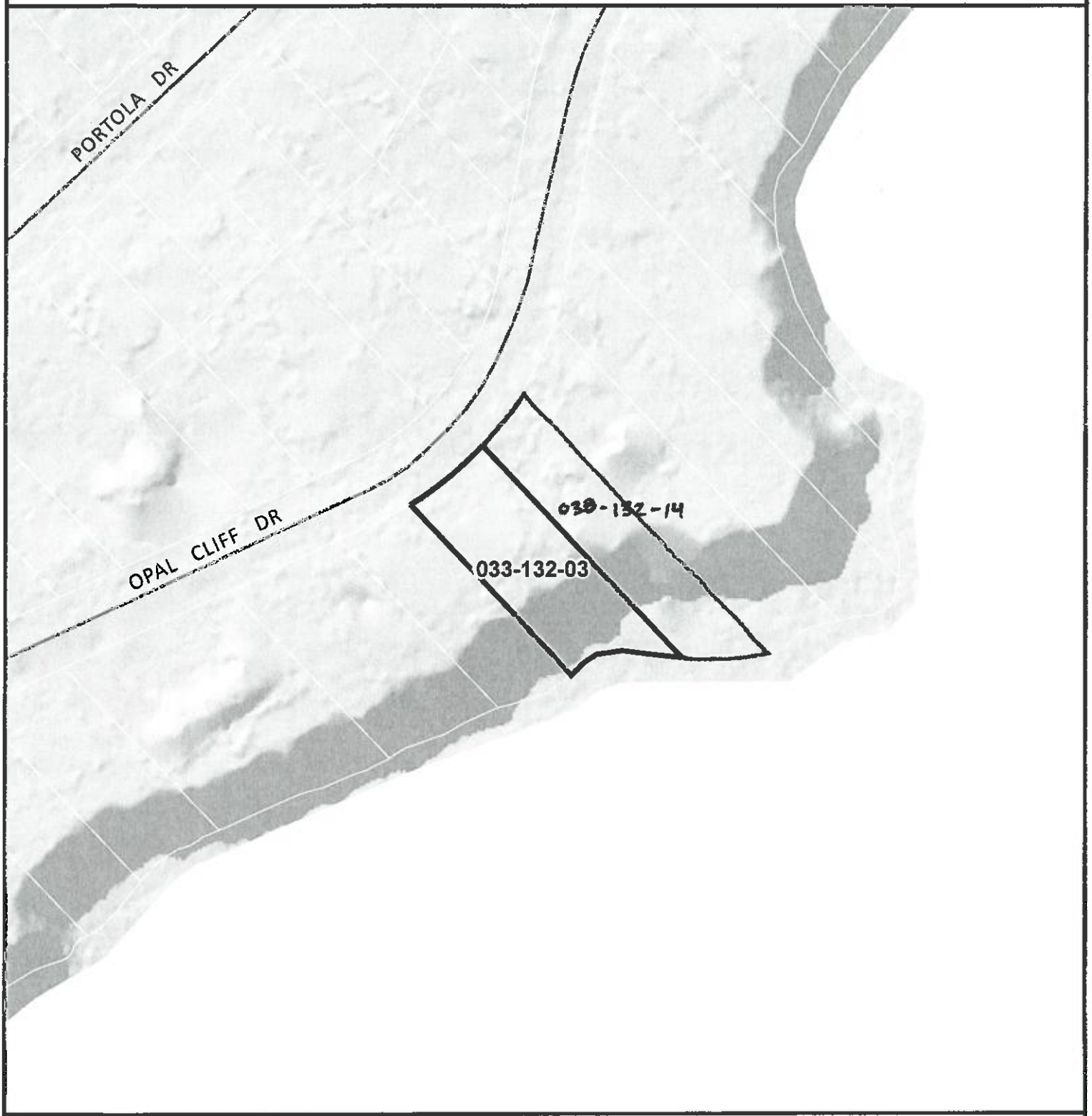
Reference:

Bowman & Williams, 2017, Jennifer Krach & Carol Sisney, Emergency Seawall Maintenance & Cliff Stabilization Plans, 4640 & 4660 Opal Cliff Drive, Santa Cruz, California, Job No. 26083.01, 4 sheets dated 18 May, 2017.

Parcel Location Map

Santa Cruz County Planning Department

Parcel Number
033-132-03
Feb. 26, 2018



Symbol Key

Street

N

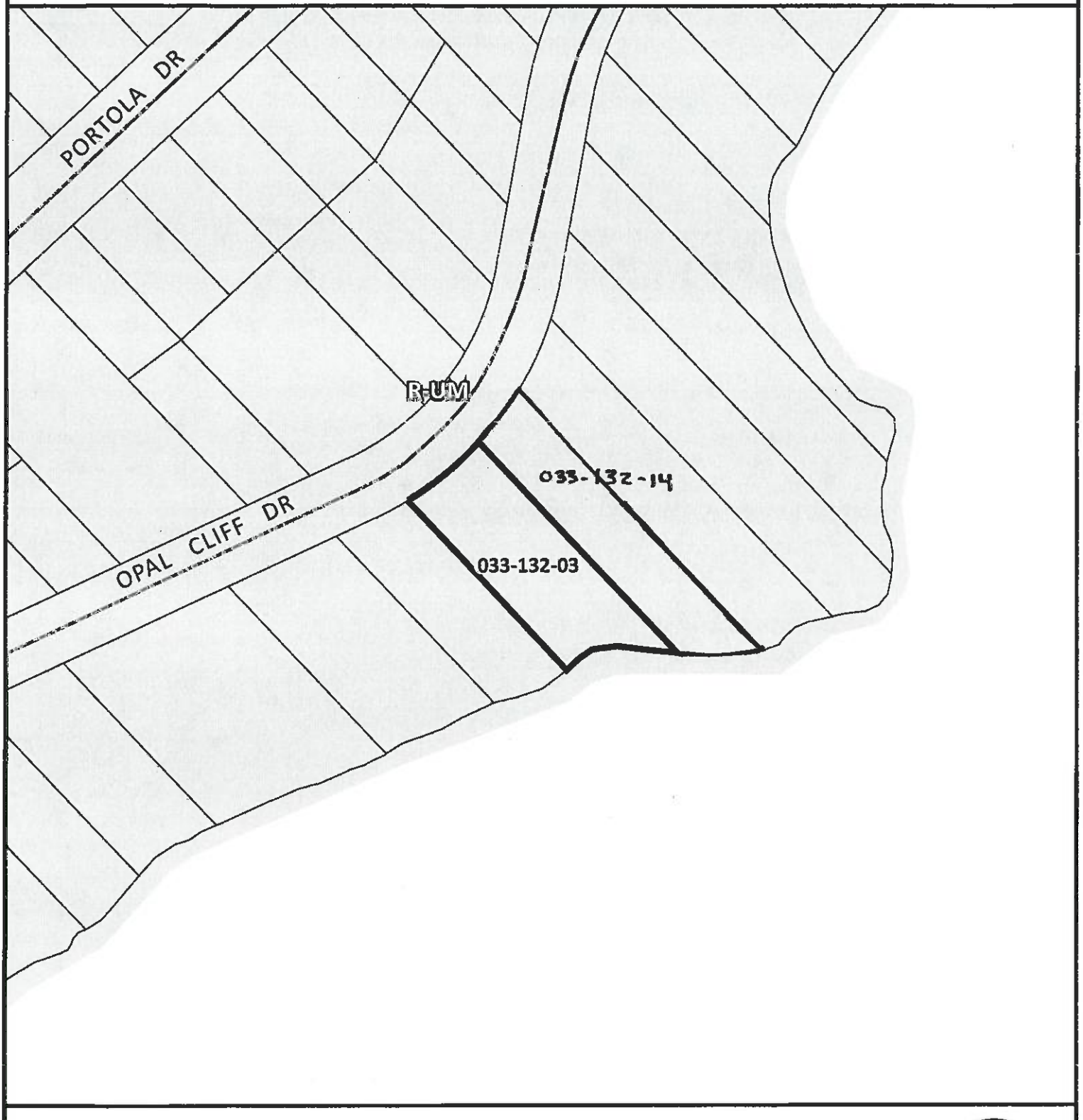
0 40 80

Feet

Parcel General Plan Map

Santa Cruz County Planning Department

Parcel Number
033-132-03
Feb. 26, 2018



General Plan

R-UM - Residential - Urban Medium Density

N

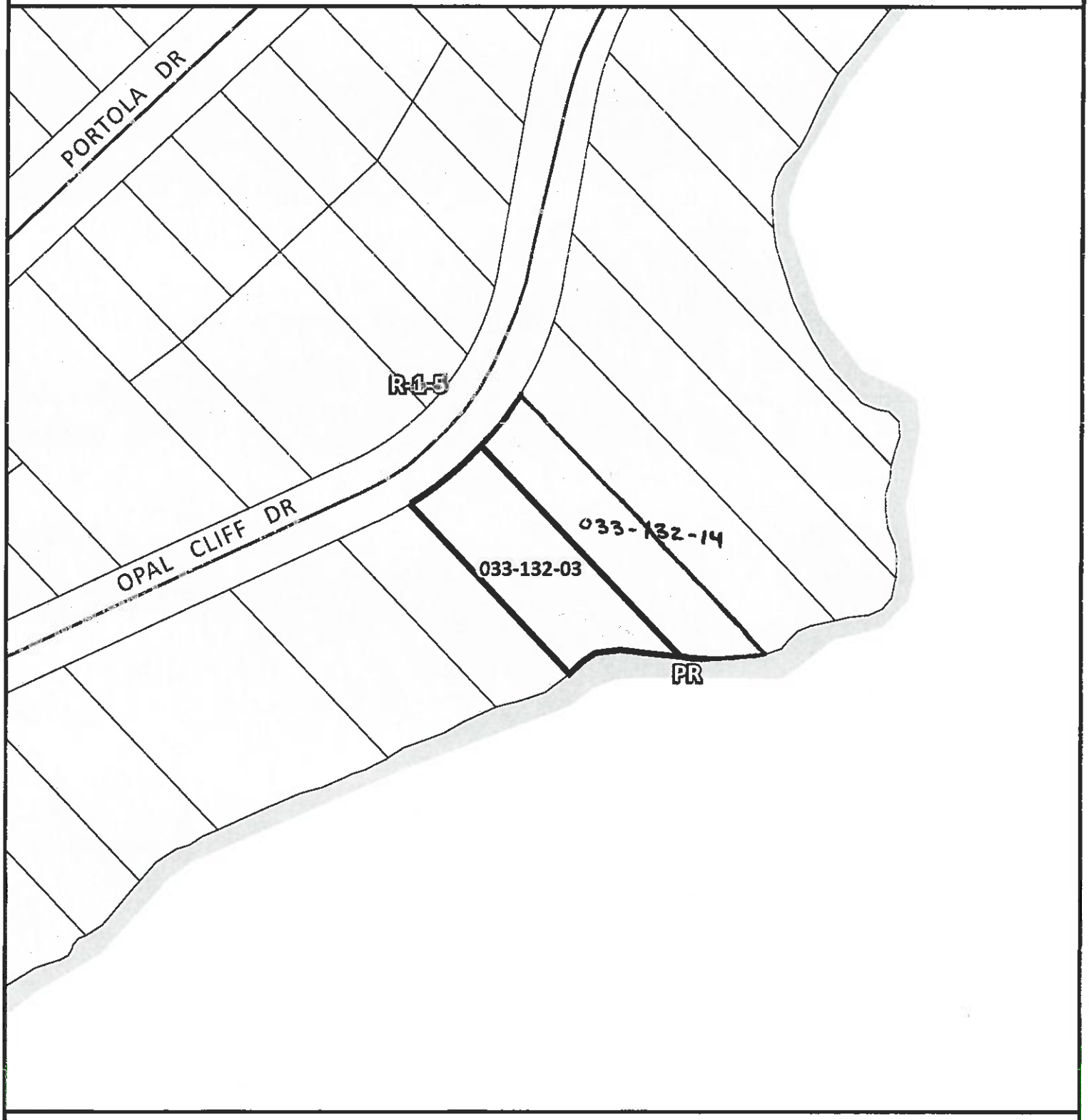
0 40 80

Feet

Parcel Zoning Map

Santa Cruz County Planning Department

Parcel Number
033-132-03
Feb. 26, 2018



Zoning

(PR) Parks, Recreation, and Open Space
(R-1) Single-Family Residential

N
0 40 80
Feet