Staff Report to the Zoning Administrator

Application Number: 211316

Applicant: Matson Britton Architects
Owner: Mary Lacerte and Kirk Kozlowski
APN: 043-081-13
Site Address: 266 Cliff Ct, Aptos

Agenda Date: 8/4/2023
Agenda Item #: 4
Time: After 9:00 a.m.

Project Description: Proposal to construct an approximately 110 linear foot pin pier retaining wall, on-site with an existing single-family dwelling.

Location: Property is located on the south side of Cliff Court, approximately 150 feet south of the intersection of Cliff Court and Rio Del Mar Blvd (266 Cliff Court).

Permits Required: Coastal Development Permit

Supervisorial District: 2nd District (District Supervisor: Zach Friend)

Staff Recommendation:

- Determine that the proposal is exempt from further Environmental Review under the California Environmental Quality Act.
- Denial of Application 211316, based on the attached findings.

Project Background

The proposed project was submitted to the Planning Department in September 2021 and was denied by the Zoning Administrator on December 16, 2022. The project was appealed by the applicant on December 27, 2022. Following an initial public hearing on March 22, 2023, the Planning Commission ultimately upheld the Zoning Administrator's denial on April 25, 2023.

An appeal of the Planning Commission's decision was filed with the Board of Supervisors on May 9, 2023. The applicant submitted an alternatives analysis (Exhibit F) to the Board for consideration at the June 13, 2023, jurisdictional hearing. The Board accepted jurisdiction of the project and instructed the Planning Department to evaluate the analysis with respect to the project and remanded the project back to the Zoning Administrator, along with direction to schedule the public hearing within 30 to 60 days.

Project Description & Setting

The subject property is located on an ocean bluff overlooking Rio Del Mar and the Beach Drive neighborhood in Aptos. Access to the property is via a private road, Cliff Court, which is located on the south side of Rio Del Mar Boulevard, approximately 1000 feet east of the intersection of

Rio Del Mar Boulevard and Aptos Beach Drive. The property slopes gently from northeast to southwest, with a portion of land extending onto the steep hillside and bluff. Existing development on the property includes an approximately 2,500 square foot dwelling which was originally developed in the early to mid-1900's as part of the Aptos Beach Inn. Except for a variance to construct an attached garage and bedroom expansion (78-113-V), permit history at the site is limited. The home is presently configured with three bedrooms, an attached garage, and an expansive backyard patio overlooking Beach Drive.

The proposed project involves the construction of approximately 110-linear feet of pin pier retaining wall along the southern property line. The wall would consist of nineteen 30-inch diameter concrete piers constructed 40-feet into the hillside, backed by an eight-foot, sub-surface concrete and steel wall. The project would also include the collection of surface drainage on-site, via a two-foot swale above the wall, which would divert water to the east side of the property, then northward along the property line into a private storm drain system which drains westward towards the Del Mar Shores condominium development.

Zoning & General Plan Consistency
The subject property is a 9,844 square foot lot, located in the R-1-6 (single-family residential - 6,000 square feet) zone district, a designation which allows residential uses. The existing dwelling on-site is a principally permitted use in the zone district and the zoning is consistent with the site's R-UL (Urban Low Density Residential) General Plan designation.

Alternatives Analysis
As directed by the Board of Supervisors at the May 9, 2023, hearing, the County Geologist and Civil Engineer reviewed the alternatives analysis, which evaluates five designs (and one "no action" scenario) for addressing the property owner's two objectives: to retain the existing soil and water on site, and for all improvements to be sited entirely within the Kozlowski's property boundaries. Staff accepted the alternatives analysis and provided comments on the project design in the Alternatives Analysis Acceptance Letter, dated July 12, 2023 (Exhibit G).

Following preparation of the acceptance letter, the County Geologist prepared a supplemental memo (Exhibit H) as a means of addressing prior claims made by the applicant regarding the project, as well as to highlight inconsistencies with the County's Geologic Hazards Ordinance. Chiefly, the memo states that although the project has been presented as a public safety matter, with the proposed project providing protection to downhill properties, both the technical reports and alternatives analysis acknowledge that the proposed project does not address the ongoing landsliding across the face of the bluff; there is no imminent threat posed by the soil located on the 266 Cliff Count parcel; and the proposed project is not the most effective solution for protecting the downhill properties at this point in time. The project as proposed reduces the threat to the downslope properties, but it does not protect the downslope properties from landslides.

Staff Recommendation for Denial
While the technical review of the alternatives analysis has been accepted for review, the project design continues to present incongruence with County Code and staff are unable to make the required findings to recommend approval of the project.

Shoreline Protection Structures
Santa Cruz County Code (SCCC) 16.10.070 provides explicit criteria for evaluating development

on coastal bluffs and beaches. Specifically, subsection (H)(3) governs shoreline protection structures, which are defined in SCCC 16.10.040 (59) as:

> "any structure or material, including but not limited to riprap or a seawall, placed in an area where *coastal processes* (emphasis added) operate."

SCCC 16.10.040 (12) defines coastal erosion processes as:

> "natural forces that cause the breakdown and transportation of earth or rock materials on or along beaches and *bluffs* (emphasis added). These forces include *landsliding* (emphasis added), surface runoff, wave action and tsunamis."

SCCC 16.10.040 (10) defines a coastal bluff as:

> "a bank or cliff along the coast subject to coastal erosion processes. "Coastal bluff" refers to the top edge, face, and base of the subject bluff."

"Shoreline protection structure" is therefore a term given in reference to a variety of structures, irrespective of whether the structure is placed at the point of physical intersect between ocean and land, and the proposed project has been evaluated as such.

It also noted that subsection SCCC 16.10.070 (H)(1) details separate criteria for that development which is not considered a shoreline protection structure, and which precludes development not only on the bluff but also requires the establishment of a 25-foot-minimum setback from the bluff edge; development on the bluff face would only be permitted for installation of shoreline protection structures consistent with the criteria in subsection (H)(3).

Findings Required for Coastal Development Permits
In evaluating a coastal development project, staff is required to affirm the Coastal Development Permit findings detailed in SCCC 13.20.110. The proposed project presents conflicts with finding (E), for compliance with applicable standards of the certified Local Coastal Program (LCP). Specifically, the project design conflicts with the Geologic Hazards Ordinance.

The following is a section-by-section evaluation for compliance with each subsection of 16.10.070(H)(3):

(a) Shoreline protection structures shall only be allowed on parcels where both adjacent parcels are already similarly protected, or where necessary to protect existing structures from a significant threat, or on vacant parcels which, through lack of protection threaten adjacent developed lots, or to protect public works, public beaches, and coastal dependent uses.

Note: New shoreline protection structures shall not be allowed where the existing structure proposed for protection was granted an exemption pursuant to subsection (H)(2) of this section.

- The adjacent parcels are not similarly protected.
- Technical reports submitted by the applicant acknowledge that the downhill property, not

the Kozlowski property, is currently threatened by landsliding on the face of the bluff (which is not owned by the Kozlowskis). As stated in the technical reports, the protection afforded to downhill properties is limited to the small portion of upper bluff which is owned by the Kozlowskis. The proposed structure will eventually help retain earth material that might form landslides, but probably only after multiple landslides have removed earth from in front of the structure.

- If the objective is to protect the homes at the base of the bluff, the proposed retaining wall is not an effective solution. The proposed retaining wall reduces the threat of a landslide to the downslope properties, but it does not protect the downslope properties from landslides. In the nearer term, it will provide little protection to homes at the base of the bluff.
- Since the proposed structure will not by itself serve to protect existing structures from significant threat, it does not meet County Code.

(b) Seawalls, specifically, shall only be considered where there is a significant threat to an existing structure and both adjacent parcels are already similarly protected.

- Seawalls are specifically acknowledged in this section as a shoreline protection structure sub-type. The proposed retaining wall, as evaluated under this section of Code, is not a seawall.

(c) Applications for shoreline protective structures shall include thorough analysis of all reasonable alternatives to such structures, including but not limited to relocation or partial removal of the threatened structure, protection of only the upper bluff area or the area immediately adjacent to the threatened structure, beach nourishment, and vertical walls. Structural protection measures on the bluff and beach shall only be permitted where nonstructural measures, such as relocating the structure or changing the design, are infeasible from an engineering standpoint or are not economically viable.

- The alternatives analysis identified the installation of flexible landslide barriers or construction of a debris flow impact structure at the base of the bluff (Alternative #4) as a one design alternative but was discarded as infeasible for not meeting the property owner's design objective to limit project siting exclusively on the owner's parcel. The owner's design objectives are prioritized over the removal, relocation, or nonstructural measures encouraged by this Code section.
- The owners self-declared objective to limit the proposed project on their parcel and retain the entirety of the project on their own property doesn't override County Code which requires the protection of structures and not just reduction of the threat from a hazard."

(d) Shoreline protection structures shall be placed as close as possible to the development or structure requiring protection.

- The proposed structure would sit several hundred feet (upslope) from the downhill home, which is stated as the threatened structure in the submitted alternatives analysis. The primary imminent hazard to the downhill home is the failing bluff face and not the portion of the property for which the proposed wall will retain. The pin pile wall as designed does not address the primary imminent hazard and therefore does not protect the downhill home from landsliding. Therefore, the proposed wall is not consistent with this criterion.

(e) Shoreline protection structures shall not reduce or restrict public beach access, adversely affect shoreline processes and sand supply, adversely impact recreational resources, increase erosion on adjacent property, create a significant visual intrusion, or cause harmful impacts to wildlife or fish habitat, archaeologic or paleontological resources. Shoreline protection structures shall minimize visual impact by employing materials that blend with the color of natural materials in the area.

The proposed project's affect on shoreline processes and sand supply as well as other requirements of this section were not addressed in the reports provided by the applicant, so staff is unable to determine compliance with this code provision.

(f) All protection structures shall meet approved engineering standards as determined through environmental review.

- The alternatives analysis states that the structure "would NOT meet approved engineering standards as determined through environmental review." Based on the applicant's testimony at previous public hearings, it is assumed that the assertion is that the structure is not engineered to withstand wave action and that is therefore not a shoreline protection structure. As noted previously in this staff report, the County Code definition of a shoreline protection structure is not exclusive to a seawall. It is the location of the structure on the bluff, not the engineering method, that subjects the project to evaluation under this subsection.

(g) All shoreline protection structures shall include a permanent, County approved, monitoring and maintenance program.

- The lack of a monitoring and maintenance program alone would not typically result in a recommendation of denial for a project. However, the program is not included in any materials provided by the applicant and should be required if this Coastal Development Permit was to be approved due to the potential for the proposed lagging to become exposed or undermined over time.

(h) Applications for shoreline protection structures shall include a construction and staging plan that minimizes disturbance to the beach, specifies the access and staging areas, and includes a construction schedule that limits presence on the beach, as much as possible, to periods of low visitor demand. The plan for repair projects shall include recovery of rock and other material that has been dislodged onto the beach.

- Similar to subsection (g), the absence of this item alone would not typically result in a recommendation for denial. Nonetheless, a plan would need to be provided and evaluated by County staff prior to project approval.

(i) All other required local, State and Federal permits shall be obtained.

- At this stage in the review process, it has been determined that no additional permitting is required.

The submitted project, including the recently prepared alternatives analysis, fails to demonstrate

compliance with items (a) through (i) of SCCC 16.10.070(H)(3). Therefore, the project does not comply with the adopted LCP and staff cannot make the affirmative findings described in SCC 13.20.110.

Conclusion

Regulations for shoreline protection structures are restrictive, and the design resulting from compliance with County Code may not align with the design goals of a property owner. While there is evidence in the record to support the fact that there is an immediate threat to the downhill neighbors along Beach Drive due to the failing bluff face, the pin pile wall as designed and proposed (at the top of the bluff) does not address this imminent hazard and does not provide protection of the downslope properties from landslides. It is therefore not compliant with the regulations set forth in the Geologic Hazards Ordinance.

As proposed and conditioned, the project conflicts with codes and policies of the Zoning Ordinance and General Plan/LCP, and Planning Staff recommends denial of this application. 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.

- **DENIAL** of Application Number **211316,** based on the attached findings.

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.sccoplanning.com

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E-mail: evan.ditmars@santacruzcounty.us

Exhibits

A. Categorical Exemption (CEQA determination)
B. Findings
C. Project plans
D. Assessor's, Location, Zoning and General Plan Maps
E. Parcel information
F. Alternatives Analysis, dated June 6, 2023
G. Alternatives Analysis Acceptance Letter, dated July 12, 2023
H. Supplemental Memo, dated July 18, 2023

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: 211316
Assessor Parcel Number: 043-081-13
Project Location: 266 Cliff Ct

Project Description: Proposal to construct a 110 linear foot pin pier retaining wall

Person or Agency Proposing Project: Matson Britton Architects

Contact Phone Number: 831-423-0544

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

E. _____ **Categorical Exemption**

Specify type: Section 15270-Projects Which Are Disapproved

F. Reasons why the project is exempt:

The proposed project is recomemnded for denial by the reviewing agency.

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

_____ Date:_____
Evan Ditmars, Project Planner

EXHIBIT A

Coastal Development Permit Findings

5. That the project conforms to all other applicable standards of the certified LCP.

This finding cannot be made, in that the project design does not comply with the Geologic Hazards Ordinance of the adopted LCP. The proposal is out of compliance with the following:

Santa Cruz County Code Chapter 16.10.070(H)(3)(a) specifies that "shoreline protection structures shall only be allowed on parcels where both adjacent parcels are already similarly protected, or where necessary to protect existing structures from a significant threat, or on vacant parcels which, through lack of protection threaten adjacent developed lots, or to protect public works, public beaches, and coastal dependent uses." Neither adjacent parcel is similarly protected and the submitted Geologic and Geotechnical Reports acknowledge that the proposed structure would likely only protect downhill properties after several decades of landsliding occur on the face of the bluff.

16.10.070(H)(3)(c) further specifies that applications for shoreline protective structures "shall include thorough analysis of all reasonable alternatives to such structures, including but not limited to relocation or partial removal of the threatened structure, protection of only the upper bluff area or the area immediately adjacent to the threatened structure, beach nourishment, and vertical walls. Structural protection measures on the bluff and beach shall only be permitted where nonstructural measures, such as relocating the structure or changing the design, are infeasible from an engineering standpoint or are not economically viable." The applicant's alternatives analysis demonstrates that alternatives to the proposed project would be feasible but were not considered because they did not meet the property owner's self-defined project objectives.

Lastly, the project does not comply with the requirement of 16.10.070(H)(3)(d), which requires shoreline protection structures "be placed as close as possible to the development of structure requiring protection." If the downslope properties are threatened by landsliding, the protection structure would need to be placed as close as possible to those structures. The proposed project location is several hundred feet uphill. Additionally, the proposed project doesn't actually protect the downslope property from landsliding.

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 cannot be made, as the long-term safety to person residing or working in the neighborhood or the general public, cannot be evaluated without a Maintenance and Monitoring Program for the proposed structure.

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 cannot be made, in that the proposal is in conflict with the County Geologic Hazards Ordinance (SCCC 16.10).

Santa Cruz County Code Chapter 16.10.070(H)(3)(a) specifies that "shoreline protection structures shall only be allowed on parcels where both adjacent parcels are already similarly protected, or where necessary to protect existing structures from a significant threat, or on vacant parcels which, through lack of protection threaten adjacent developed lots, or to protect public works, public beaches, and coastal dependent uses." Neither adjacent parcel is similarly protected and the submitted Geologic and Geotechnical Reports acknowledge that the proposed structure would likely only protect downhill properties after several decades of landsliding occur on the face of the bluff.

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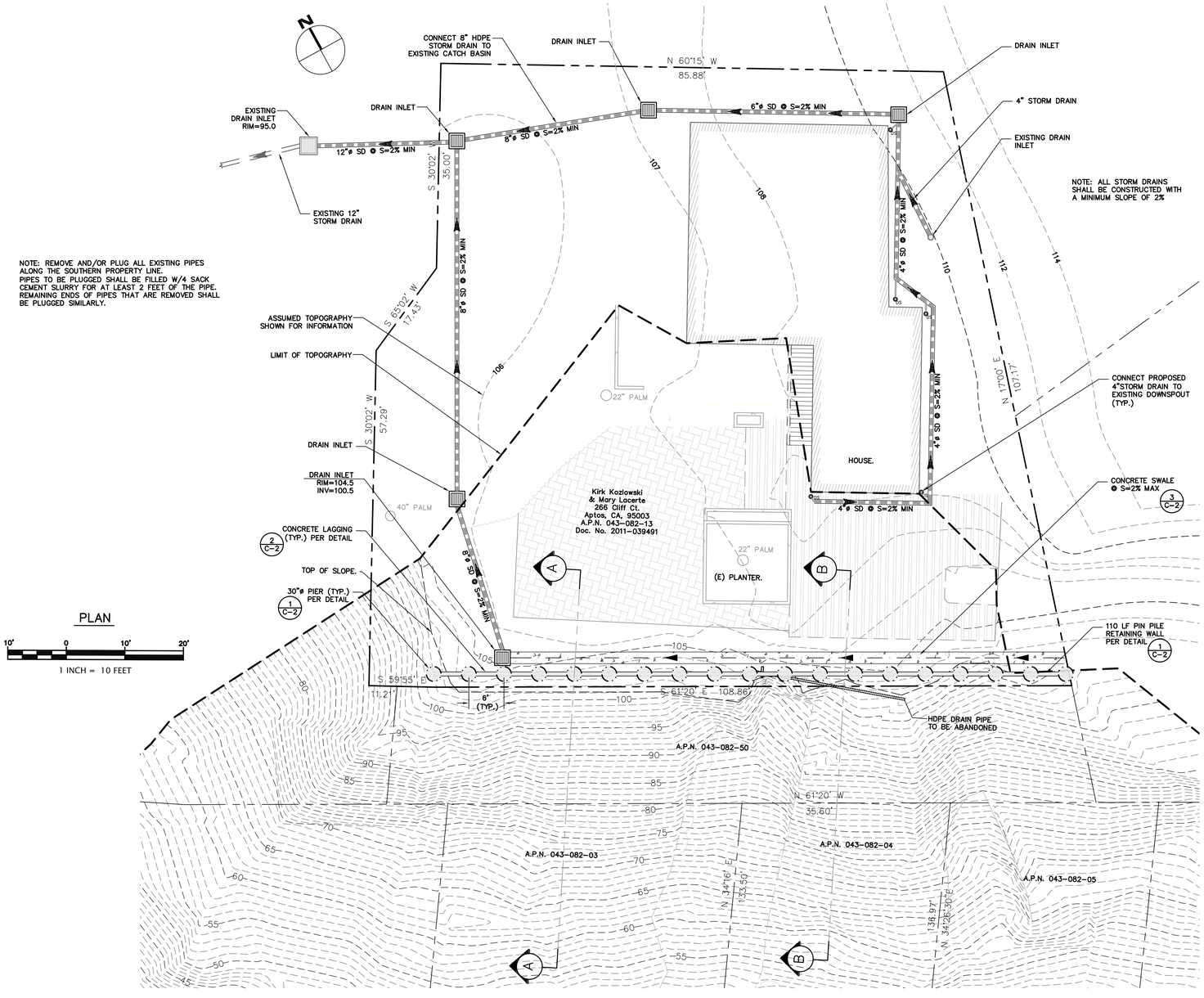
Lastly, the project does not comply with the requirement of 16.10.070(H)(3)(d), which requires shoreline protection structures "be placed as close as possible to the development of structure requiring protection." If the downslope properties are threatened by landsliding, the protection structure would need to be placed as close as possible to those structures. The proposed project location is several hundred feet uphill. Additionally, the proposed project doesn't actually protect the downslope property from landsliding.

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 cannot be made, in that the proposal does not comply with Policy 6.2.16 (Structural

Shoreline Protection Measures), which limits structural shoreline protection measures to structures which protect existing structures from a "significant threat" and requires that "any application for shoreline protection measure include a thorough analysis of all reasonable alternatives". 6.2.16 also specifies that "the protection structure must be placed as close as possible to the development requiring protection". The project identifies the downslope properties as those threatened by landsliding on the bluff but sites the proposed structure several hundred feet away from those homes. Additionally, the proposed project doesn't actually protect the downslope property from landsliding. The alternatives analysis provides two alternatives to the proposed project which would be sited as close as possible to the downslope properties and would also protect those properties from landsliding, but do not meet the project objectives self-defined by the property owner.



PLAN

10' 0 10' 20'

1 INCH = 10 FEET

NOTE: REMOVE AND/OR PLUG ALL EXISTING PIPES ALONG THE SOUTHERN PROPERTY LINE.
PIPES TO BE PLUGGED SHALL BE FILLED W/4 SACK CEMENT SLURRY FOR AT LEAST 2 FEET OF THE PIPE. REMAINING ENDS OF PIPES THAT ARE REMOVED SHALL BE PLUGGED SIMILARLY.

ABBREVIATIONS

BW	BOTTOM OF WALL
CB	CATCH BASIN
CONST	CONSTRUCT
DIA, ø	DIAMETER
DS	DOWNSPOUT
DTL	DETAIL
DWY	DRIVEWAY
(E)	EXISTING
EL	ELEVATION
EOP	EDGE OF PAVEMENT
FF	FINISH FLOOR
FG	FINISH GRADE
FS	FIRE SERVICE
HP	HIGH POINT
INV	INVERT
LF	LINEAR FEET
LP	LOW POINT
MAX	MAXIMUM
N.T.S.	NOT TO SCALE
RW	RETAINING WALL
RIM	RIM ELEVATION
S	SLOPE
SCCO	COUNTY OF SANTA CRUZ
SSCO	SANITARY SEWER CLEANOUT
SDCO	STORM DRAIN CLEANOUT
TYP	TYPICAL
TW	TOP OF WALL
WS	WATER SERVICE

SEWER LATERAL NOTES

1. SEWER LATERALS SHALL BE POLYVINYL CHLORIDE (PVC SDR26) AND SHALL HAVE A SMOOTH INTERIOR.

2. SEWER LATERALS SHALL BE SLOPED AT A MINIMUM 2%

STORM DRAIN SYSTEM MAINTENANCE

THE HOME OWNER IS RESPONSIBLE FOR MAINTAINING THE STORM DRAINAGE SYSTEM AND ALL COMPONENTS. EVERY YEAR, PRIOR TO THE WET WEATHER SEASON (OCTOBER 15TH) ALL THE CATCH BASINS AND STORM DRAIN CLEANOUTS SHALL BE INSPECTED AND CLEANED OF ANY DEBRIS, SILT, TRASH AND SEDIMENT.

STORM DRAINAGE NOTES

1. CULVERTS SHALL BE POLYVINYL CHLORIDE (PVC SDR35), HIGH DENSITY POLYETHYLENE (HDPE ADS N12 OR EQUAL), OR REINFORCED CONCRETE PIPE (RCP), AND SHALL HAVE A SMOOTH INTERIOR CONFORMING TO SECTION E – STORM DRAINAGE FACILITIES OF COUNTY OF SANTA CRUZ DESIGN CRITERIA.

2. INLETS SHALL BE CHRISTY CONCRETE PRODUCTS OR APPROVED EQUAL WITH SMOOTH CONCRETE BOTTOM.

3. DISCHARGE ALL DOWNSPOUTS TO PERIMETER STORM DRAIN.

TOPOGRAPHIC SURVEY

THE TOPOGRAPHIC SURVEY AND BOUNDARY INFORMATION PROVIDED HEREON WAS COMPLETED BY HANAGAN LAND SURVEYING. RI ENGINEERING INC. MAKES NO GUARANTEE AS TO THE ACCURACY OF BOTH. THE CONTRACTOR SHALL VERIFY THE BOUNDARY LOCATION AND TOPOGRAPHIC INFORMATION PRIOR TO COMMENCING WORK.

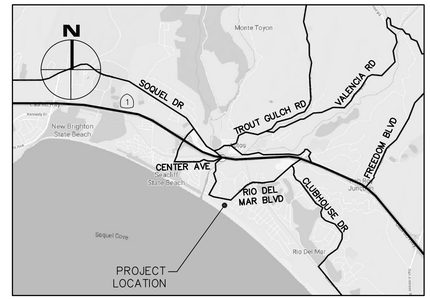
BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS MAP HAS BEEN REESTABLISHED BETWEEN FOUND MONUMENTS ON THE NORTH LINE OF BEACH DRIVE PER RECORD MAP 024-M-26, SANTA CRUZ COUNTY RECORDS.

BASIS OF ELEVATION

COUNTY BENCHMARK NO. 476,
ELEVATION = 13.40', NAVD 88

THE CONTOUR INTERVAL IS 1 FOOT.



VICINITY MAP
NTS

LEGEND

- (E) BRICK PATIO
- (E) DECK
- (E) CONCRETE
- PROPOSED AC
- (E) FLOWLINE
- (E) RETAINING WALL
- PROPERTY LINE
- PROPOSED SETBACK
- LIMIT OF TOPOGRAPHY
- PROPOSED CONCRETE LAGGING
- PROPOSED SWALE
- PROPOSED SD
- PROPOSED PERIMETER SD
- PROPOSED SDCO
- EXISTING CB
- PROPOSED CB
- PROPOSED PIER
- PROPOSED CONCRETE SWALE

EARTHWORK AND GRADING

1. WORK SHALL CONSIST OF ALL CLEARING, GRUBBING, STRIPPING, PREPARATION OF LAND TO BE FILLED, EXCAVATION, SPREADING, COMPACTION AND CONTROL OF FILL, AND ALL SUBSIDIARY WORK NECESSARY TO COMPLETE THE GRADING TO CONFORM TO THE LINES, GRADES, AND SLOPES, AS SHOWN ON THE APPROVED PLANS.

2. ALL GRADING OPERATIONS SHALL CONFORM TO SECTION 19 OF THE CALTRANS STANDARD SPECIFICATIONS, AND SHALL ALSO BE DONE IN CONFORMANCE WITH THE REQUIREMENTS OF THE COUNTY OF SANTA CRUZ. THE MOST STRINGENT GUIDELINE SHALL PREVAIL.

3. REFERENCE IS MADE TO THE GEOTECHNICAL INVESTIGATIONS BY PACIFIC CREST ENGINEERING, ENTITLED "266 CLIFF COURT," DATED MAY 22, 2021. THE CONTRACTOR SHALL MAKE A THOROUGH REVIEW OF THIS REPORT AND SHALL FOLLOW ALL RECOMMENDATIONS THEREIN. THE CONTRACTOR SHALL CONTACT PACIFIC CREST ENGINEERING. FOR ANY CLARIFICATIONS NECESSARY PRIOR TO PROCEEDING WITH THE WORK.

4. THE CONTRACTOR SHALL GRADE TO THE LINE AND ELEVATIONS SHOWN ON THE PLAN AND SHALL SECURE THE SERVICES OF A LICENSED LAND SURVEYOR OR REGISTERED CIVIL ENGINEER TO PROVIDE STAKES FOR LINE AND GRADE.

5. THE GEOTECHNICAL ENGINEER SHOULD BE NOTIFIED AT LEAST FOUR (4) DAYS PRIOR TO ANY SITE CLEARING AND GRADING OPERATIONS.

6. STRIPPED AREAS SHOULD BE SCARIFIED TO A DEPTH OF ABOUT 6", WATER-CONDITIONED TO BRING THE SOILS WATER CONTENT TO ABOUT 2% ABOVE THE OPTIMUM, AND COMPACTED TO A DENSITY EQUIVALENT TO AT LEAST 90% OF THE MAXIMUM DRY DENSITY OF THE SOIL ACCORDING TO ASTM D1557 (LATEST EDITION). SUBGRADES AND AGGREGATE BASE ROCK FOR PAVEMENTS SHOULD BE COMPACTED TO A MINIMUM OF 95%.

7. ENGINEERED FILL SHOULD BE PLACED IN THIN LIFTS NOT EXCEEDING 8" IN LOOSE THICKNESS, MOISTURE CONDITIONED, AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION.

8. MATERIAL USED FOR ENGINEERED FILL SHALL MEET THE REQUIREMENTS OF THE AFOREMENTIONED REPORTS BY PACIFIC CREST ENGINEERING.

9. IMPORTED FILL MATERIAL USED AS ENGINEERED FILL FOR THE PROJECT SHALL MEET THE REQUIREMENTS OF THE AFOREMENTIONED GEOTECHNICAL INVESTIGATION.

10. ALL FILL MATERIAL SHALL BE APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER PRIOR TO JOBSITE DELIVERY AND PLACEMENT. NO EARTHWORK OPERATIONS SHALL BE PERFORMED WITHOUT THE DIRECT OBSERVATION AND APPROVAL OF THE GEOTECHNICAL ENGINEER.

11. BARE GROUND WITHIN 10' OF FOUNDATIONS SHALL BE SLOPED AWAY @ 5% MINIMUM OR 2% MINIMUM FOR PAVED SURFACES.

Exhibit C

PLANNING SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER
RICHARD J. RITH
No. 45810
Exp. 12-31-22
CIVIL
STATE OF CALIFORNIA

6/3/2021

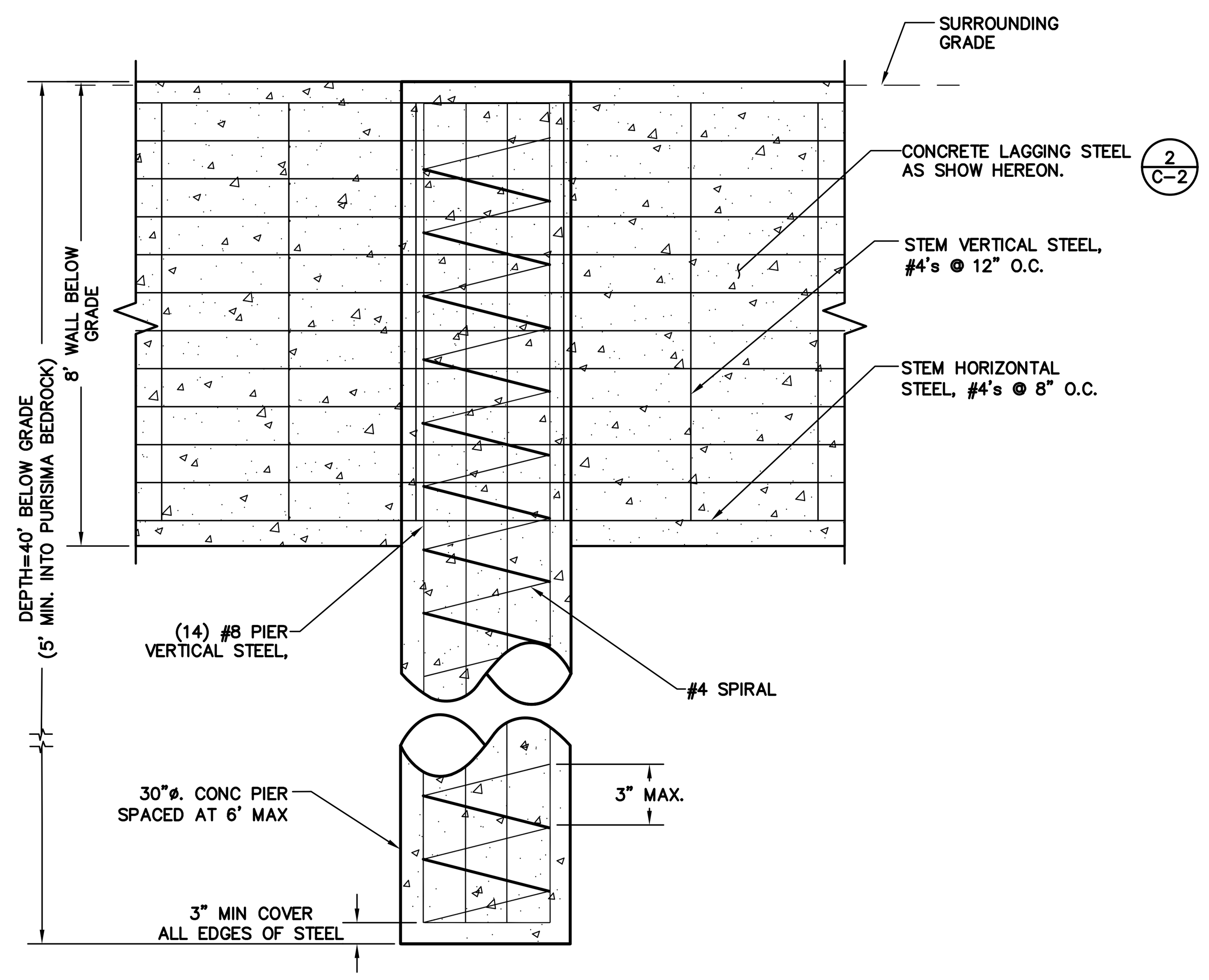
R.I Engineering, Inc.
303 Potrero St., Suite 42-202, Santa Cruz, CA 95060
831-425-3901 www.riengineering.com

RESIDENTIAL ADDITION
FOR
KIRK & MARY KOZLOWSKI
266 CLIFF COURT
APTOS, CA 95003
APN # 043-081-13

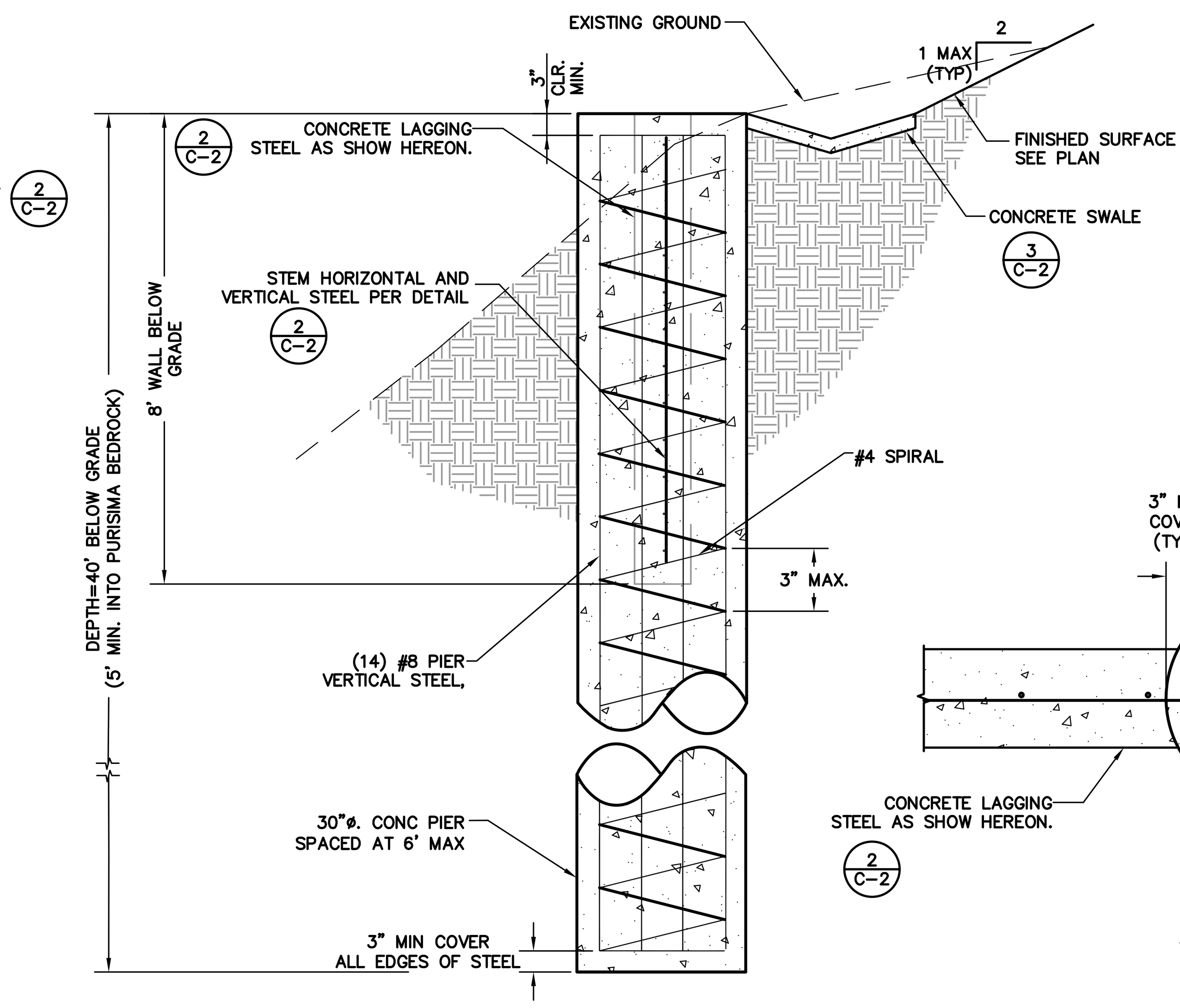
GRADING & DRAINAGE PLAN

project no. 20-074-1
date JUNE 2021
scale AS SHOWN
dwg name CIVIL1.dwg

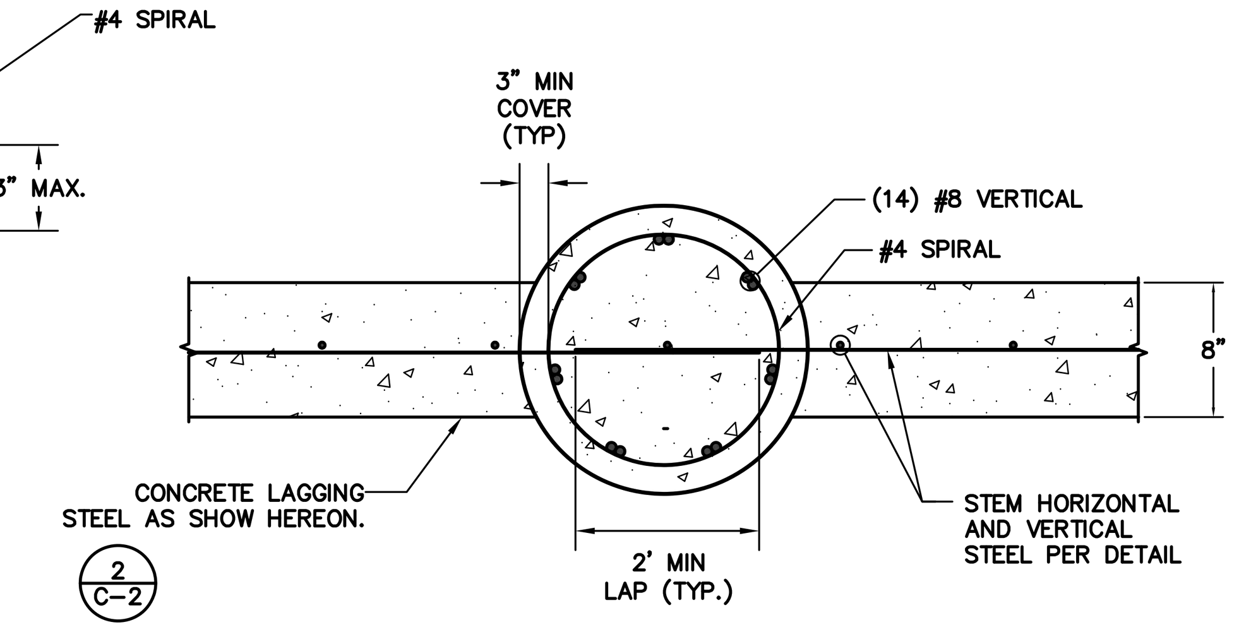
C-1



ELEVATION VIEW



SECTION VIEW



PLAN VIEW

PIN PIER WALL & CONCRETE LAGGING (1 / C-2)
NTS

SPECIFICATIONS

1. CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH CBC SECTION 1905 AND ACI 301.

2. CONCRETE SHALL BE TYPE V AND HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 4,500 PSI. CONCRETE SHALL HAVE A MAXIMUM WATER TO CEMENT RATIO OF 0.50.

3. STEEL REINFORCING SHALL CONFORM TO ASTM DESIGNATION A614, GRADE 60.

4. PLACEMENT AND HANDLING OF STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF SECTION 52, "REINFORCEMENT OF THE CALTRANS STANDARD SPECIFICATIONS.

5. ANCHOR BOLTS SHALL CONFORM TO ASTM DESIGNATION A 307 OR ASTM DESIGNATION A36. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN CONFORMANCE WITH SECTION 75-1.05 "GALVANIZING" OF THE CALTRANS STANDARD SPECIFICATIONS.

6. TIMBER CONNECTORS, SHEAR WALL HOLD DOWNS AND OTHER METAL FASTENINGS SHALL BE SIMPSON STRONG TIE COMPANY CONNECTORS OR APPROVED EQUAL. FASTERERS SHALL BE HOT DIP GALVANIZED.

8. EXPOSED POSTS SHALL BE PRESSURE TREATED DOUG FIR LARCH NO.1 OR APPROVED EQUAL.

9. STRUCTURAL LUMBER SHALL BE DOUGLAS FIR-LARCH OR EQUAL. LUMBER AND TIMBER SHALL BE OF THE STRESS GRADE SHOWN ON THE PLANS IF NO DESIGNATION IS SHOWN ON THE PLANS ALL COLUMNS, BEAMS, GIRDERS, JOISTS AND PURLINS SHALL BE #2 GRADE OR BETTER. STRUCTURAL TIMBERS SHALL BE GRADED IN ACCORDANCE WITH THE CURRENT STANDARD GRADING PRACTICES ADOPTED BY THE WESTERN WOOD PRODUCTS ASSOCIATION. ALL SIZES SHOWN ON THE PLANS SHALL REFER TO NOMINAL SIZES, UNLESS OTHERWISE NOTED.

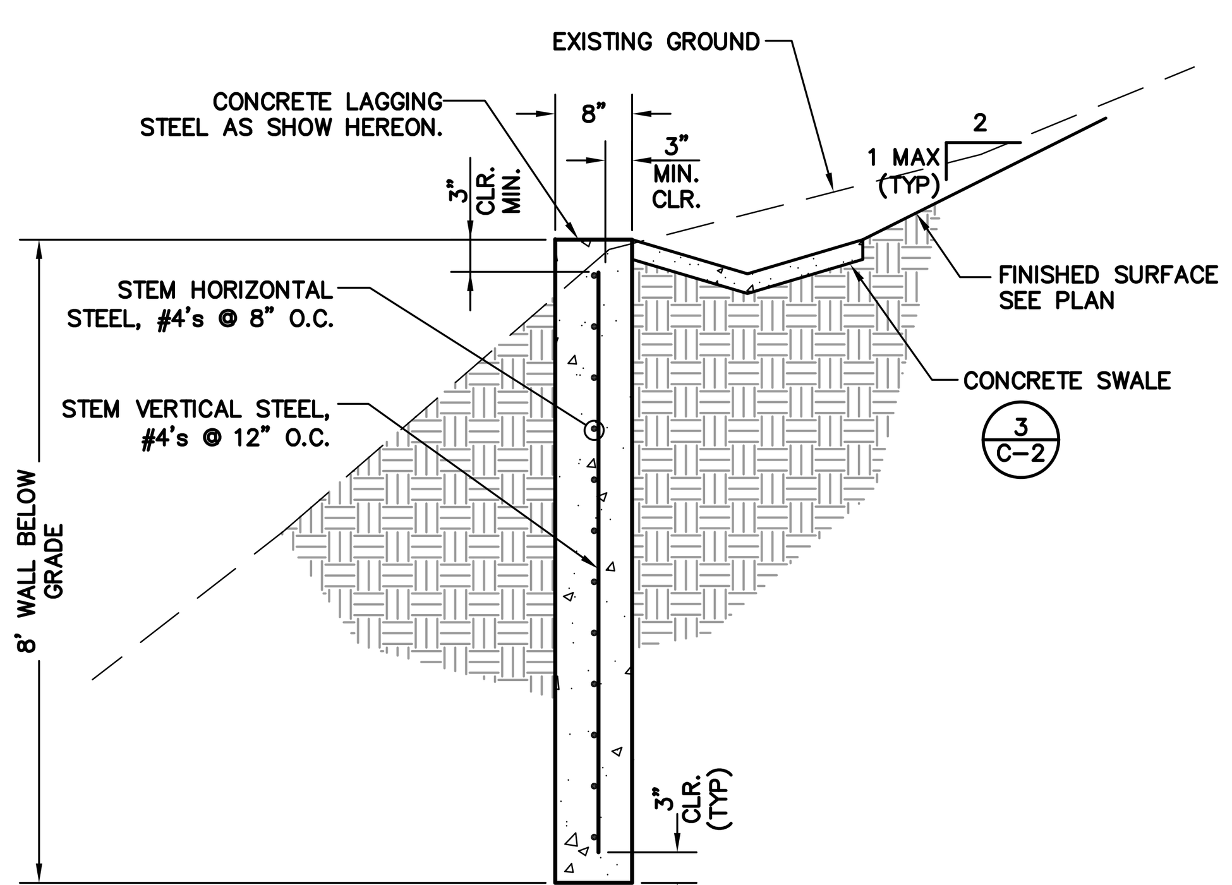
10. PRESERVATIVE TREATMENT OF LUMBER SHALL CONFORM TO THE REQUIREMENTS OF SECTION 58 OF THE CALTRANS STANDARD SPECIFICATIONS. CUT ENDS AND EXPOSED PORTIONS OF PRESSURE TREATED LUMBER SHALL BE IMMERSED A MINIMUM OF 6" INTO PRESERVATIVE SOLUTION. GUARDRAIL POSTS AND BLOCKS SHALL MET THE REQUIREMENTS OF CALTRANS CURRENT SPECIFICATIONS AND THESE PLANS. WHICHEVER STANDARD IS MORE STRINGENT SHALL APPLY.

12. NOTE DOCUMENTATION SHALL BE PROVIDED THAT VERIFIES I-BEAM SOLDER PILES COMPLY WITH THE REQUIREMENTS OF THE AISC 360 AS SPECIFIED IN CBC, SECTION 2205.1

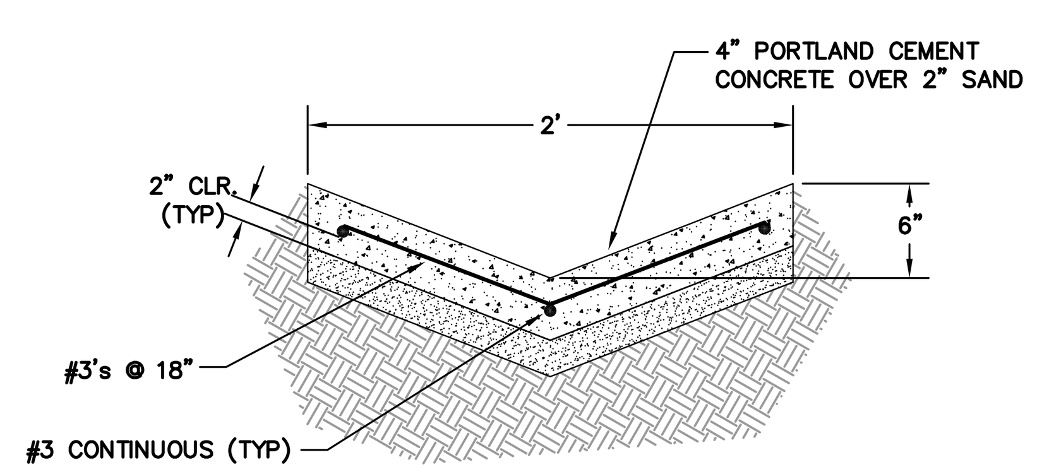
13. STRUCTURAL STEEL SHALL CONFORM TO ASTM DESIGNATION A36 AND SHALL HAVE A MINIMUM ALLOWABLE BENDING STRESS OF 36,000 PSI. BOLTED AND WELDED CONNECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE 2016 CALIFORNIA BUILDING CODE AND THESE SPECIFICATIONS.

14. WELDED CONNECTIONS SHALL MEET THE REQUIREMENTS OF FEMA 350 AND THE 2001 CALIFORNIA BUILDING CODE CHAPTER 22, "STEEL."

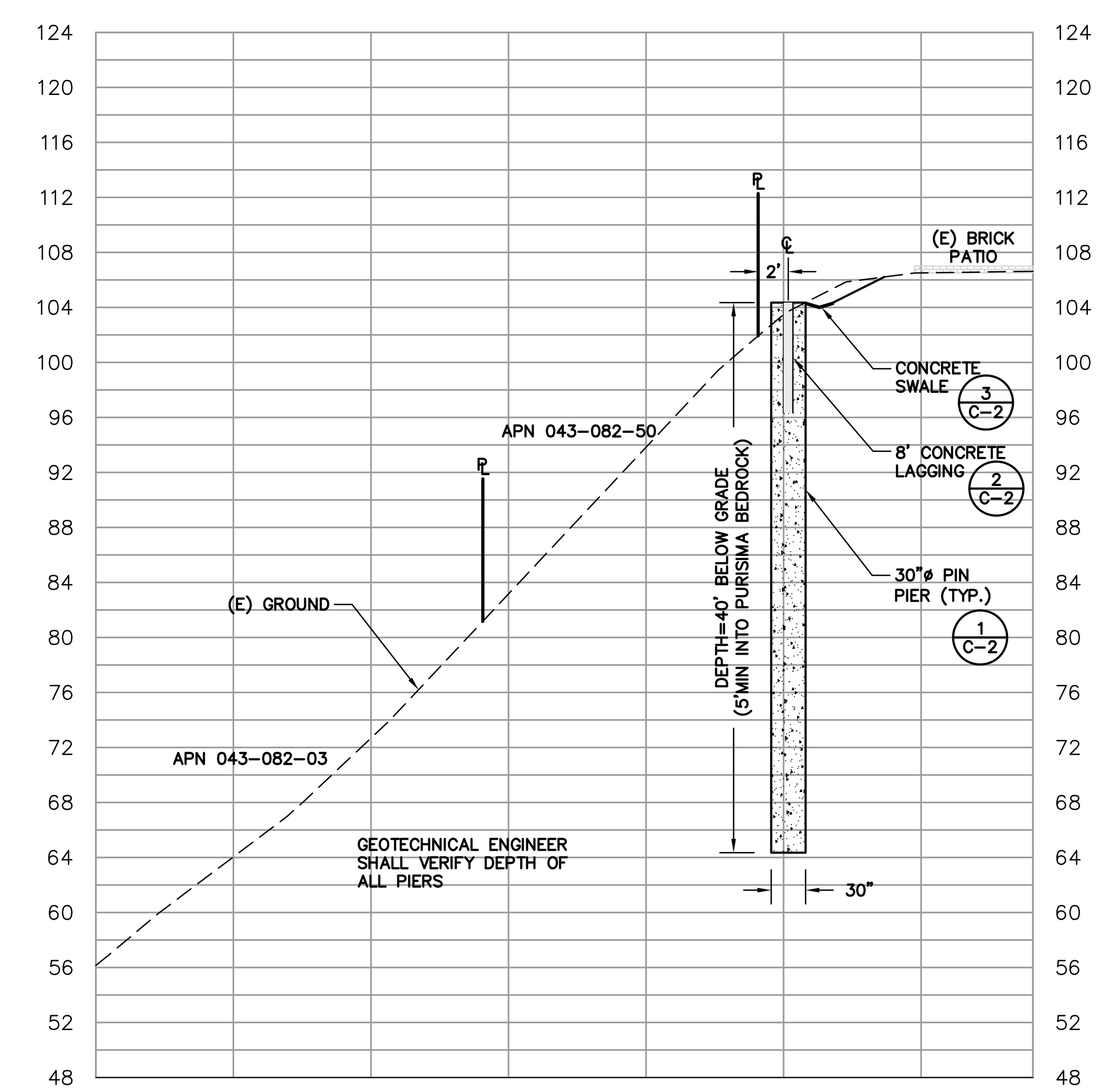
15. ALL NAILS AND ANCHOR BOLTS THAT WILL BE IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE HOT-DIPPED GALVANIZED PER ASTM A153. FASTENERS AND CONNECTORS EXPOSED TO WET WEATHER SHALL BE STAINLESS STEEL, TYPE A304



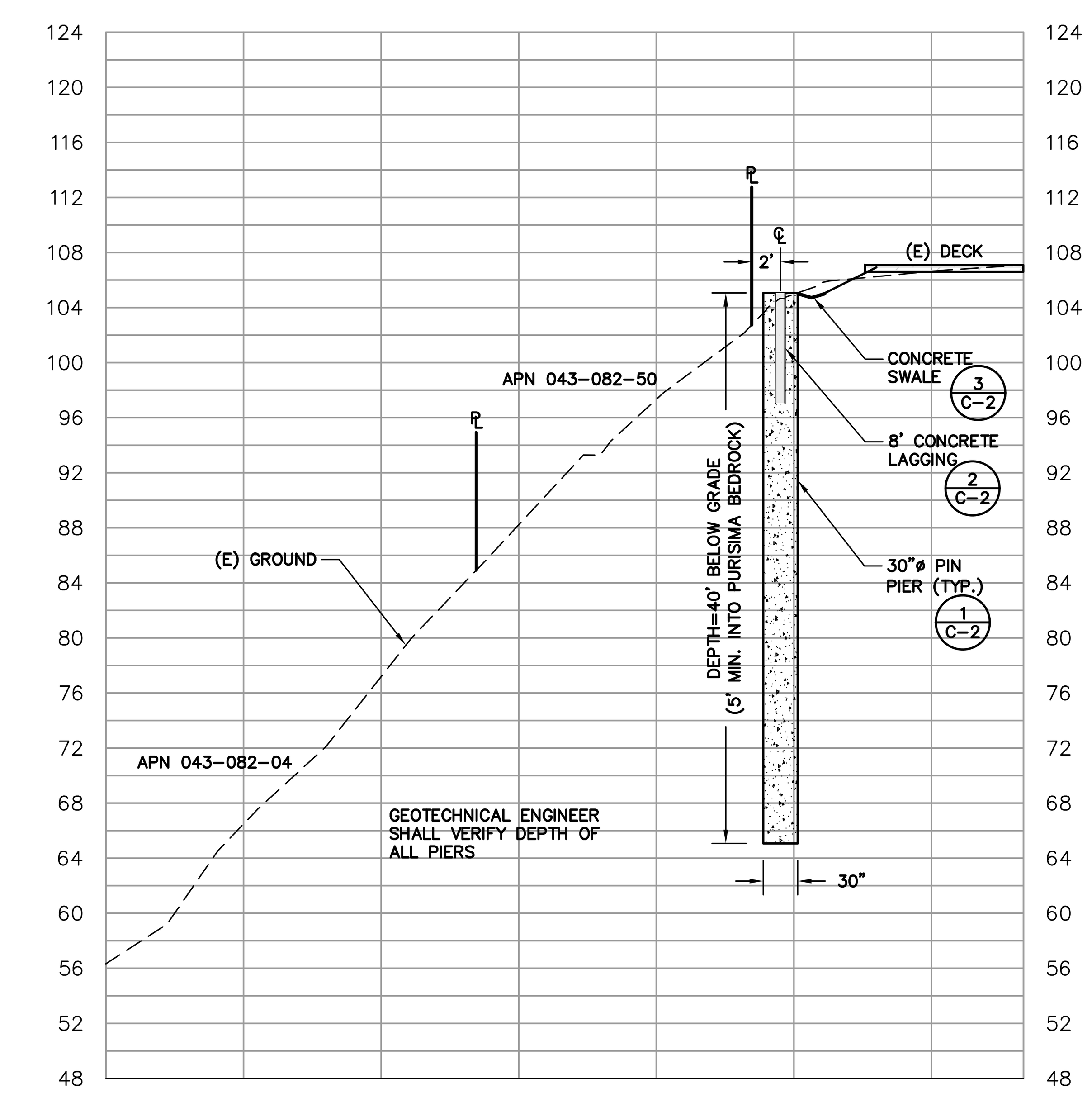
CONCRETE LAGGING SECTION (2 / C-2)
NTS



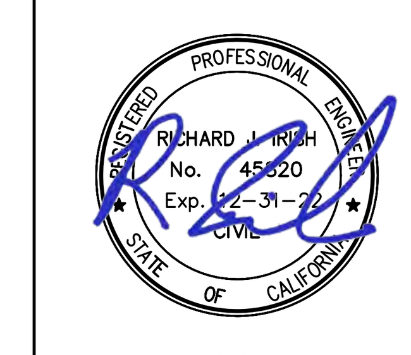
CONCRETE SWALE DETAIL (3 / C-2)
NTS



SECTION A-A
SCALE: 1"=10' HORIZONTAL, VERTICAL



SECTION B-B
SCALE: 1"=10' HORIZONTAL, VERTICAL



6/3/2021

RI Engineering, Inc.
303 Potrero St., Suite 42-202, Santa Cruz, CA 95060
831-425-3901 www.riengineering.com

RESIDENTIAL ADDITION
FOR
KIRK & MARY KOZLOWSKI
266 CLIFF COURT
APTOS, CA 95003
APN # 043-081-13

DETAILS

project no.
20-074-1
date
JUNE 2021
scale
AS SHOWN
dwg name
CIVIL1.dwg

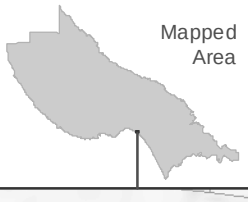
C-2

Exhibit C

PLANNING SUBMITTAL

SANTA CRUZ COUNTY PLANNING DEPARTMENT

Parcel Location Map



RIO DEL MAR BL

CLIFF CT

043-081-13

KINGSBURY DR

BEACH DR

Seacliff
State Beach

Parcel: 04308113

- Study Parcel
- Assessor Parcel Boundary
- Existing Park

Map printed: 26 Oct. 2022

Exhibit D

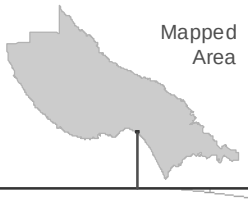
N

0 20 40

Feet

SANTA CRUZ COUNTY PLANNING DEPARTMENT

Parcel General Plan Map



R-UH

R-UL

043-081-13
(R-UL)

O-U

R-UL

O-R

O-R *Parks, Recreation & Open Space*
O-U *Urban Open Space*
R-UH *Res. Urban High Density*
R-UL *Res. Urban Low Density*

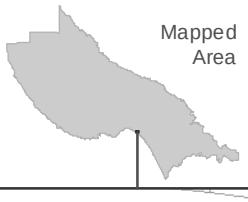
Exhibit D

N

0 20 40
Feet

SANTA CRUZ COUNTY PLANNING DEPARTMENT

Parcel Zoning Map



RM-2.5

R-1-6

043-081-13
(R-1-6)

PR

R-1-6

PR

PR *Parks, Recreation, & Open Space*
R-1 *Single-Family Residential*
RM *Residential Multi-Family*

N

0 20 40
Feet

Exhibit D

Parcel Information

Services Information

Urban/Rural Services Line:	_X_ Inside __ Outside
Water Supply:	Soquel Creek Water District
Sewage Disposal:	Santa Cruz Sanitation District
Fire District:	Central Fire Protection District
Drainage District:	Flood Control Zone 6

Parcel Information

Parcel Size:	9,844 square feet
Existing Land Use - Parcel:	Residential
Existing Land Use - Surrounding:	Residential
Project Access:	Private, via Cliff Ct and Rio Del Mar Blvd
Planning Area:	Aptos
Land Use Designation:	R-UL (Urban Low Density Residential)
Zone District:	R-1-6 (Single family residential - 6,000 square feet)
Coastal Zone:	_X_ Inside __ Outside
Appealable to Calif. Coastal Comm.	_X_ Yes __ No

Technical Reviews: Geotechnical Report Review (REV211508)

Environmental Information

Geologic Hazards:	Known hazard (bluff failure) on south side of property
Fire Hazard:	Not a mapped constraint
Slopes:	0-15% on majority of site, greater than 50% on bluff side (south property line)
Env. Sen. Habitat:	Not mapped/no physical evidence on site
Grading:	Grading for retaining wall only
Tree Removal:	No trees proposed to be removed
Scenic:	Not a mapped resource
Archeology:	Portion of site is mapped archeological resource, project area is not mapped

6 June 2023 Project No. 2008

Kirk and Mary Kozlowski
139 Vineyard Court
Los Gatos, CA 95032

Re: **Alternatives Analysis**
266 Cliff Court
Aptos, California
County of Santa Cruz, A.P.N. 043-081-13
Coastal Development Permit Application 211316

Dear Kirk and Mary,

This report is intended to respond to the County of Santa Cruz Planning Commission (CSCPC) request to summarize the alternatives for engineered mitigation schemes for future debris flow flows issuing out of the portion of the coastal bluff owned by you and striking the residences (constructed between 1932 and 1964) below on Beach Drive. The request came by a passed motion made by Commissioners Schiffrin and Gordin in the 22 March 2023 hearing. Their motion flowed from a discussion by the Commissioners and County staff in the 22 March 2023 hearing regarding the possibility of continuing the application to the next CSCPC hearing (26 April 2023), at which point the application would be continued a second time in order to allow for an appropriate amount of time for completion of the alternatives analysis by our firm and the subsequent review by County of Santa Cruz staff (Audio for CSCPC 22 March 2023 hearing).

It appears that the Planning Commission then denied the application without prejudice in the 26 April 2023 hearing (Minutes from 26 April 2023 CSCPC hearing) despite a formal request for a continuance and contrary to the agreed upon sequence of events for the application made in the 22 March 2023 hearing.

We have nonetheless prepared this alternatives analysis pursuant to the agreement made in the 22 March 2023 hearing.

PROJECT DESCRIPTION

The application for this project was filed to construct approximately 110 feet of pin pier retaining wall only on the owner's property and to make drainage improvements to the property that redirect stormwater away from the seaward edge of the property (see attached August 2021 civil engineering plans by R.I. Engineering).

Exhibit F

INTRODUCTION/HISTORY

The following documents were produced for this project by both the consultant team and the County of Santa Cruz:

Date	Report	By
2/18/2020	Topographic map and sections	Hanagan Land Surveying
4/22/2021	Geotechnical Investigation - Design Phase	Pacific Crest Engineering
8/20/2021	Civil Engineering Plans	R.I. Engineering
9/1/2021	Focused geologic investigation of coastal erosion and landsliding	Zinn Geology
10/26/2021	County Agency Comments	County of Santa Cruz
10/29/2021	County completeness letter	County of Santa Cruz
1/12/2022	Response to Discretionary Application Comments letter	R.I. Engineering
3/17/2022	County Letter Of Acceptance For Geology and Geotech reports	County of Santa Cruz
4/20/2022	Incomplete Application – Additional Information Required letter	County of Santa Cruz
5/3/2022	Appeal of Notice of Incomplete Application letter	Nossaman
6/15/2022	Complete application submittal letter	County of Santa Cruz
9/14/2022	Pin Pier Wall Comments	R.I. Engineering
11/16/2022	Response to County Staff Report	Pacific Crest Engineering
11/17/2022	Civil engineering letter for ZA hearing	R.I. Engineering
11/18/2022	County staff report for ZA hearing	County of Santa Cruz
12/16/2022	Staff Report to the Zoning Administrator	County of Santa Cruz
12/22/2022	Appeal of Zoning Administrator decision letter	Nossaman
1/27/2023	Appeal from January 19, 2023 Decision of Mr. Matt Machado letter	Nossaman
2/3/2023	Cliff Court BAFCAB Appeal Response letter	County of Santa Cruz
3/15/2023	Letter regarding soil volume to be retained	Pacific Crest Engineering
3/22/2023	County staff report	County of Santa Cruz
4/26/2023	County staff memorandum	County of Santa Cruz
4/27/2023	Engineering drainage plans for Emergency Coastal Development Permit	R.I. Engineering
6/6/2023	Memo regarding proposed pin pier wall	R.I. Engineering

We have provided a distilled historical synopsis of the design and application process below. The distillation is by no means meant to be exhaustive. We have appended what we consider to be an exhaustive chronological compilation of the written record in Appendix C, so that the reader may consult that appendix in order to gain a more plenary understanding of the record.

A letter by Zinn Geology dated 1 September 2021 presented a distilled geological analysis of the process of terrestrial landsliding that is driving landward at the top of the bluff in front of the Kozlowski's property. It is important to note that the seaward edge of the Kozlowski's

Exhibit F

property lies almost entirely along the top of the bluff and NOT entirely on the bluff face itself, which lies mostly seaward and is not owned by the Kozlowski's (refer to Plate 1 in Appendix A of this letter for a graphical depiction of the top of bluff with respect to the subject property line and proposed pin pier wall). Zinn Geology made findings in their 2021 letter regarding the landsliding out of the coastal bluff at this location, including the following:

2. The coastal bluff below their property has repeatedly failed incrementally in the form of debris flows and shallow landslides, some of which have struck the residences below the property.

3. The coastal bluff will continue to retreat in the future via continued incremental, piecemeal landslide events.

6. The package of artificial fill, marine terrace deposits, Purisima Formation and colluvium will fail incrementally and repeatedly until overall the slope reaches a ***conservative*** *slope angle of approximately 30 degrees. We have drawn this future projected bluff configuration line on our geological cross sections (Plate 2).*

Zinn Geology also noted in their 2021 letter: ***"Since the Kozlowskis do not really own the bluff face and do not have permission from the "buffer" property owner to work on that property, any system installed for this project will need to stop at the Kozlowski property line, right at the top of bluff or slightly below it."*** (bold emphasis added)

The most important recommendation from the Zinn Geology 2021 letter was:

1. The Project Geotechnical Engineer and Project Civil Engineer should design a retention system that lies on the property and will prevent the soil and weathered bedrock owned by Kirk and Mary from failing as the coastal bluff retreats, as least as much as practicable.

The Zinn Geology letter was accepted by the County of Santa Cruz peer reviewing geologist, Jeffrey Nolan on 17 March 2022. In their acceptance letter they stipulated:

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

Plans for the bluff top pin pier wall that complied with the recommendations from the 2021 Zinn Geology letter and the 2021 Pacific Crest Engineering geotechnical report were issued by R.I. Engineering in August 2021.

After a 21 March 2022 application submittal, the County of Santa Cruz issued a "Complete Application Submittal" letter dated 15 June 2022. The County indicated in that letter that *"As of May 14, 2022, this application has been considered* ***complete for further processing*** *(bold emphasis added)."*

Exhibit F

Subsequent supplemental letters were issued by Pacific Crest Engineering and R.I. Engineering that covered different aspects of the proposed pin pier design. A 16 November 2022 letter by Pacific Crest Engineering indicated that the "pin-pile soil retention system would be an effective and reasonable measure for stabilizing bluff materials on the Kozlowski property and restrain them from impacting the downslope properties on Beach Drive". The letter also indicated that the "geotechnical recommendations were never intended to be applied to the design of a shoreline protection structure."

A 17 November 2022 letter by R.I. Engineering indicated that the proposed pin pier wall was determined to be the most feasible alternative by the design team. They also indicated that the pin pier wall was not designed to provide shoreline protection because it is not designed to resist undermining.

Another letter by Pacific Crest, dated 15 March 2023, indicated that the total calculated volume of soil that would be retained by the proposed pin pier retaining wall and prevented from striking the residences below is approximately 1000 cubic yards. It is important to note that Pacific Crest Engineering clearly indicated in that letter that this volume is unlikely to fail all at once, but will likely happen incrementally over decades, primarily in the form of debris flows.

A 22 March 2023 Planning Commission Staff Report by the County of Santa Cruz recommended denial of the project because *"…the recommendation of denial is not based solely on the proposed placement of the Applicant's retaining wall. Instead, and as discussed in the project completeness letter (Exhibit 1B, dated June 15, 2022), the submitted application was deficient in that it did not contain all required submittal materials; therefore, the submittal did not demonstrate compliance with subsections of 16.10.070(H)."*

Finally, a memo issued by R.I. Engineering, dated 6 June 2023, stipulates that their design for the proposed pin pier wall is not engineered to be a *"shoreline protection structure"*. It is important to note that R.I. Engineering is the Project Civil Engineer of Record and they have clearly communicated that their design does NOT *"meet approved engineering standards as determined through environmental review"*, as stipulated in the County of Santa Cruz Building Code section 16.10.070.H.3.f, as well as the Santa Cruz County General Plan section 6.2.16 paragraph 5 – "Shoreline protection structures shall be designed to meet approved engineering standards for the site as determined through the environmental review process."

EXISTING CONDITIONS AND SITE CONSTRAINTS

The coastal bluff in front of the Kozlowski property has failed again this past winter, resulting in a debris flow striking one of the residents below as well as depositing debris flow deposits above a retaining wall that lies directly behind the residences at 301 and 303 Beach Drive. The upper 15 feet of the bluff is now oversteepened with respect to the soil exposed in the 2023 scar. As noted in the Zinn Geology 1 September 2021 letter and the Pacific Crest

Engineering 15 March 2023, this process will continue until the upper bluff has laid back to a more stable angle.

The application submitted by the Kozlowski's is for the proposed construction of drainage improvements and construction of a pin pier wall. The primary goal of the application and the design is to prevent the soil and water owned by the Kozlowski's from moving downslope and inundating or striking the residences that lie below their property along Beach Drive.

It is not practical, nor legally supportable (as per counsel, Greg Sanders) to require the Kozlowskis to provide landslide mitigation measures off of their property for soil they do not own. County staff have not provided any basis to date for such a requirement. Furthermore, the Kozlowski's have not to date received cooperation regarding constructing a soil retention structure from the owners of the property that abuts their seaward property line.

SERIOUSNESS OF THE THREAT AND RISK TO THE DOWNSLOPE RESIDENCES

The threat analysis was covered by Zinn Geology in their 2021 letter. The Beach Drive residences (originally built between 1932 and 1964) that lie below the Kozlowski property have been struck in the past by debris flows triggered by intense rainfall and issuing out of the bluff face seaward of the Kozlowski property. This threat of future debris flows striking the residences below will continue in the future until the coastal bluff lays back to an angle that is stable for the exposed soil during intense rainfall and seismic shaking. As the bluff continues to retreat in a piecemeal fashion landward across the Kozlowski property, their soil will be a source of the debris flows that could strike the residences below. The proposed pin pier wall will clearly contribute to a portion of the ongoing life-safety issue presented to the residences below.

PROJECT OBJECTIVES

The principal objective of the proposed project is to prevent the soil and water owned by the Kozlowski's from striking the residences located directly below their property along Beach Drive.

Since the Kozlowskis do not own the bluff face (it lies seaward of their property) and do not have the requisite cooperation from the "buffer" property owner (that lies seaward of their property) to work on that property, any system installed for this project will need to stop at the Kozlowski property line, right at the top of bluff or slightly below it. So a second objective for the design is that the structure/system must be constructed entirely on the Kozlowski's property.

The storm water system is also of concern, because there are pipes on the bluff of unknown

origin that could give downslope owners the perception that the Kozlowskis are draining water down the face of the bluff. A third objective is to capture all water that falls on the Kozlowski property and direct it away from the bluff, at least as much as is practicable. It is important to note that the proposed soil retention system and changes to the storm water system are not needed to protect the existing Kozlowski residence or access to the residence. The proposed design is engineered solely to prevent the soil and water owned by the Kozlowskis from mobilizing as a debris flow and striking the residences below their property.

AVAILABLE ALTERNATIVES

Several alternatives to retaining the soil and water on the Kozlowski's property have been considered and are discussed below.

Alternative 1 – Do nothing and allow the Kozlowski's soil and water to wash/fail downslope
Alternative 2 – Attempt to arrest bluff failure with vegetation
Alternative 3 – Construct soil retention structures on the bluff from top to bottom
Alternative 4 – Construct debris flow impact structures at the base of the bluff
Alternative 5 – Deflect stormwater away from the top of the bluff on the Kozlowski property
Alternative 6 – Construct a pin pier wall on the Kozlowski property

Alternative 1 – Do nothing and allow the Kozlowski's soil and water to wash/fail downslope

If no action is taken to redirect the water and retain the soil on the Kozlowski property, the top of the bluff will continue to fail and eventually breach their seaward property line. In our opinion this may occur as soon as next winter in some locations along their seaward property line. This may result in debris flows emanating from the Kozlowski's soil striking the residences that lie below the Kozlowski property. This does not meet the first (and primary) project objective.

Alternative 2 – Attempt to arrest bluff failure with vegetation

Arresting coastal bluff failure above Beach Drive with using only planted vegetation is virtually impossible, due to the forces required to stabilize the heavy load of soil in an oversteepened face. During the winter months when the soils are wet and winds are heavy, large bluff face trees typically topple, bringing masses of soil with them. Some native vines and shrubs, such as poison oak, as well as invasive plants (pampas grass) can help to temporarily stabilize bluff face soils, but their roots are not strong or deep enough to retain saturated soil on a steep bluff face.

Since most of the Kozlowski property actually lies behind the bluff top line and they cannot encroach on the adjacent properties with a mitigation, the installation of vegetation on the bluff face is not even logistically feasible.

Therefore this alternative is not only logistically infeasible, but will not resolve the long term issue of continued debris flows issuing out of the bluff face. This alternative does not meet any of the project objectives.

Alternative 3 – Construct soil retention structures on the bluff from top to bottom

A top-to-bottom slope stabilization system installed off of and below the Kozlowski property, such as Geobrugg Tecco installed in tandem with Geobrugg Tecmat, could partially prevent their soil from failing out of the bluff and striking the residences below.

Another possibility for a top-to-bottom slope stabilization system is a soil nail wall. This system can be installed on soil slopes that are vertical to near vertical, which is the current condition of the bluff top seaward of the Kozlowski property.

Unfortunately, as noted in the prior alternative, most of the Kozlowski property actually lies behind the bluff top line and they cannot encroach on the adjacent properties with a mitigation. Therefore this alternative is not logistically feasible. This alternative does not meet the project objectives.

Alternative 4 – Construct debris flow impact structures at the base of the bluff

Construction of flexible shallow landslide barriers, such as the Geobrugg Shallow Landslide Barriers SL or debris flow impact walls would mitigate the debris flow risk to the residences along Beach Drive. These structures are designed to stop and capture debris flows and prevent them from striking roads and buildings. They would need to be located as close to the structures being protected (which are the Beach Drive residences in this case) as possible in order to capture all the permutations of potential debris flow sources. Debris flow impact structure design requires geological and geotechnical engineering investigations to characterize the potential debris flow volumes and velocities, along with foundation parameters for the impact structures.

Unfortunately this alternative would need to be installed entirely off of the Kozlowski property, which conflicts with their objective of keeping the mitigation solely on their property. Additionally, if the debris flow barrier system is overwhelmed by a large debris flow event that involves the Kozlowski's soil and water, resulting in damage to the Beach Drive residences or injury/death of the occupants, the Kozlowskis will still be liable for damages and subject to potential claims. In summary, this alternative is not logistically feasible and does not does not meet the project objectives.

Exhibit F

Alternative 5 – Deflect stormwater away from the top of the bluff on the Kozlowski property

Construction of an engineered drainage system that captures stormwater and deflects it away from the seaward property line on the Kozlowski property will partially mitigate future debris flows emanating from the Kozlowski's soil and property.

This alternative has already been proposed in tandem with the proposed pin pier system by R.I. Engineering. R.I. Engineering has also proposed to install just the engineered drainage system as part of an Emergency Coastal Development Permit submitted in April 2023.

Relying solely on drainage improvements will not prevent the future debris flows from issuing from the bluff. The soils on the bluff face will still become saturated from storms during wet rainy seasons and fail when subjected to a debris flow rainfall threshold event. Therefore, solely relying upon this alternative will not achieve the objective of prevent the Kozlowski's soil from mobilizing as a debris flow and striking the residences below. Relying solely upon this alternative does not meet the project objectives.

Alternative 6 – Preferred Alternative - Construct a pin pier wall on the Kozlowski property

This alternative consists of constructing a row of soldier piles installed just behind the top of the bluff (entirely on the Kozlowski property) with returns at both ends that is designed to act as a continuous retaining wall through the mechanism of soil arching. The piers are typically "stitched" together with a reinforced grade beam at and slightly below the ground surface. This retaining system will only retain the soil upslope of the piers, so the soil downslope of the piers will continue to fail. It will be necessary to install lagging between exposed piers as the soil downslope from the piers continues to fail over time.

Our firm, along with R.I. Engineering has worked on this type of solution at similar locations within one mile of the Kozlowski property with County of Santa Cruz approval.

The location of the pin pier wall at the seaward property line for the Kozlowski's property **will maximize the stabilization of the soil owned by the Kozlowski's** that will fail in the future if left unretained.

This alternative can satisfy all the project objectives.

Table A (below) presents a comparative summary of the alternatives:

TABLE A: COMPARITIVE SUMMARY OF ALTERNATIVE

ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	PREVENTS KOZLOWSKI'S SOIL FROM STRIKING RESIDENCES FOR THE LONG-TERM (100-YEARS)*	MEETS PROJECT OBJECTIVES	FEASIBLE (AS DEFINED IN THE COUNTY BUILDING CODE)	IMPACTS COASTAL ACCESS
1	Do nothing and allow the Kozlowski's soil and water to wash/fail downslope	NO	NO	YES	NEGATIVE
2	Attempt to arrest bluff failure with vegetation	NO	NO	YES	NEGATIVE
3	Construct soil retention structures on the bluff from top to bottom	YES	NO	YES	NEGATIVE
4	– Construct debris flow impact structures at the base of the bluff	YES	NO	YES	NEGATIVE
5	Deflect stormwater away from the top of the bluff on the Kozlowski property	NO	NO	YES	NEGATIVE
6	Construct a pin pier wall on the Kozlowski property	YES	YES	YES	NEGATIVE

*Assumes future maintenance and repair takes place as needed

In summary, the only alternative considered in this analysis that meets all the project objectives and that is allowed by the County of Santa Cruz code is Alternative 6, the current proposed pin pier system. In our opinion, the pin pier system should be constructed along with the proposed engineered drainage system to prevent water owned by the Kozlowskis from draining seaward off their property toward the residences below along Beach Drive.

This concludes our alternatives analysis for this project. Please do not hesitate to contact us if you have any questions about this letter or our work or need further assistance.

Sincerely,

PACIFIC CREST ENGINEERING INC.

Erik N. Zinn
Principal Geologist
P.G. #6854, C.E.G. #2139

Appendix A – Annotated civil engineering site plan by R.I. Engineering
Appendix B – Civil engineering plans by R.I. Engineering
Appendix C – Historical documents related to the project

APPENDIX A – ANNOTATED CIVIL ENGINEERING SITE PLAN BY R.I. ENGINEERING

Exhibit F

Exhibit F

29

Pacific Crest
ENGINEERING INC

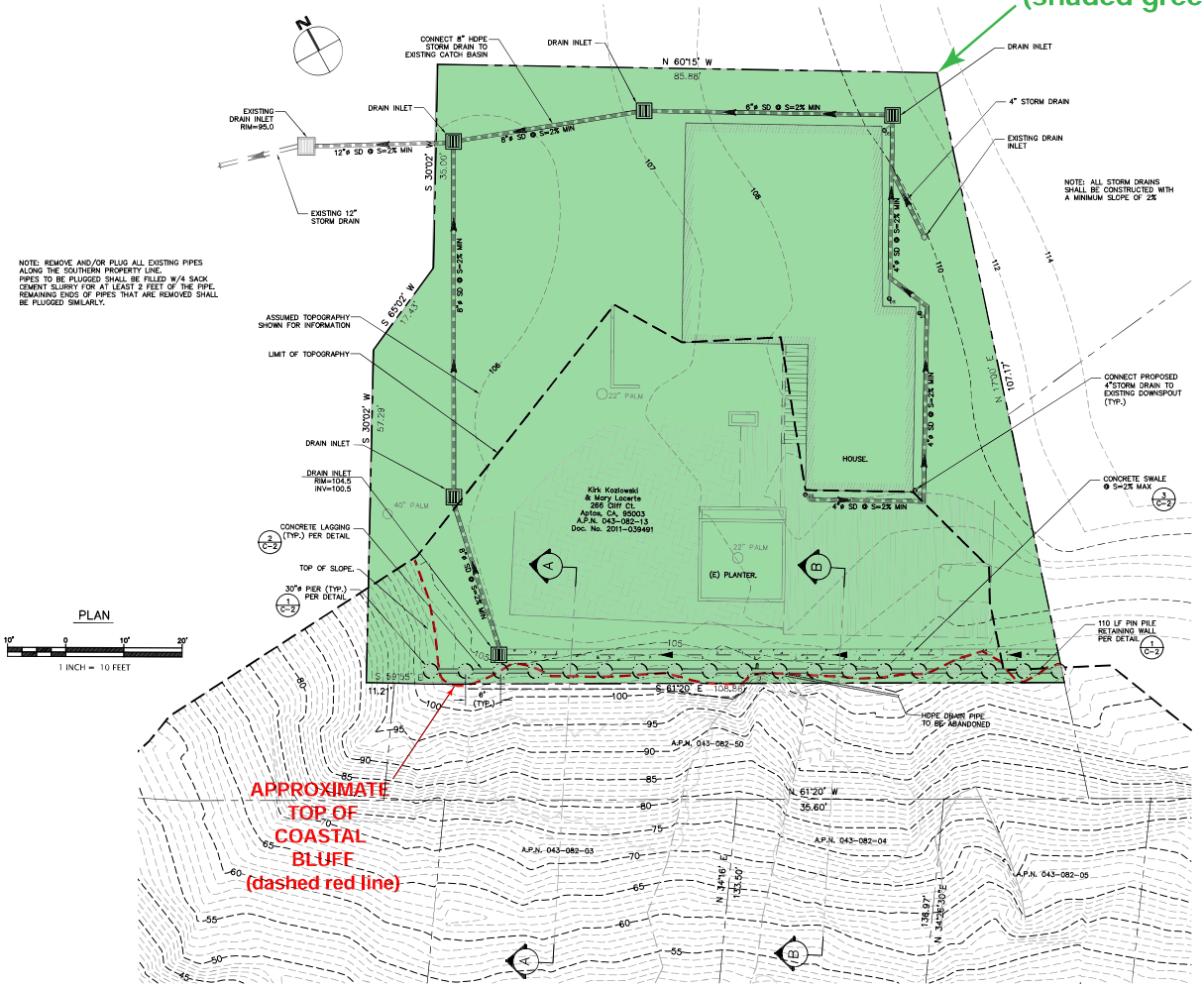
ANNOTATED CIVIL ENGINEERING SITE MAP
Kozlowski Property
266 Cliff Court
Aptos, CA 95006

Date: 6 June 2023	Revised:
Job #2008	
Scale: 1"=10'	**Plate 1**
Drawn by: ENZ/enz	

PROFESSIONAL GEOLOGIST — ERIK N. ZINN — No. 6854 — STATE OF CALIFORNIA

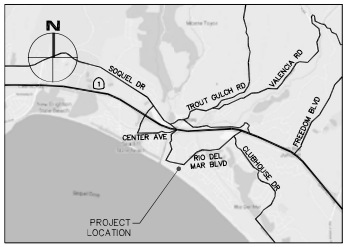
CERTIFIED ENGINEERING GEOLOGIST — ERIK N. ZINN — No. 2139 — STATE OF CALIFORNIA

KOZLOWSKI PROPERTY (shaded green)



PLAN

10' 0 10' 20'
1 INCH = 10 FEET



VICINITY MAP
NTS

LEGEND

- (E) BRICK PATIO
- (E) DECK
- (E) CONCRETE
- PROPOSED AC
- (E) FLOWLINE
- (E) RETAINING WALL
- PROPERTY LINE
- PROPOSED SETBACK
- LIMIT OF TOPOGRAPHY
- PROPOSED CONCRETE LAGGING
- PROPOSED SWALE
- PROPOSED SD
- PROPOSED PERIMETER SD
- PROPOSED SDCO
- EXISTING CB
- PROPOSED CB
- PROPOSED PIER
- PROPOSED CONCRETE SWALE

ABBREVIATIONS

BW	BOTTOM OF WALL
CB	CATCH BASIN
CONST	CONSTRUCT
DIA. ø	DIAMETER
DS	DOWNSPOUT
DTL	DETAIL
DWY	DRIVEWAY
(E)	EXISTING
EL	ELEVATION
EOP	EDGE OF PAVEMENT
FF	FINISH FLOOR
FG	FINISH GRADE
FS	FIRE SERVICE
HP	HIGH POINT
INV	INVERT
LF	LINEAR FEET
LP	LOW POINT
MAX	MAXIMUM
N.T.S.	NOT TO SCALE
RW	RETAINING WALL
RIM	RIM ELEVATION
S	SLOPE
SCCO	COUNTY OF SANTA CRUZ
SSCO	SANITARY SEWER CLEANOUT
SDCO	STORM DRAIN CLEANOUT
TYP	TYPICAL
TW	TOP OF WALL
WS	WATER SERVICE

SEWER LATERAL NOTES

1. SEWER LATERALS SHALL BE POLYVINYL CHLORIDE (PVC SDR26) AND SHALL HAVE A SMOOTH INTERIOR.
2. SEWER LATERALS SHALL BE SLOPED AT A MINIMUM 2%

STORM DRAIN SYSTEM MAINTENANCE

THE HOME OWNER IS RESPONSIBLE FOR MAINTAINING THE STORM DRAINAGE SYSTEM AND ALL COMPONENTS. EVERY YEAR, PRIOR TO THE WET WEATHER SEASON (OCTOBER 15TH) ALL THE CATCH BASINS AND STORM DRAIN CLEANOUTS SHALL BE INSPECTED AND CLEANED OF ANY DEBRIS, SILT, TRASH AND SEDIMENT.

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BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS MAP HAS BEEN REESTABLISHED BETWEEN FOUND MONUMENTS ON THE NORTH LINE OF BEACH DRIVE PER RECORD MAP 024-M-26, SANTA CRUZ COUNTY RECORDS.

BASIS OF ELEVATION

COUNTY BENCHMARK NO. 476,
ELEVATION = 13.40', NAVD 88

THE CONTOUR INTERVAL IS 1 FOOT.

BASE MAP: "Grading & Drainage Plan - Site Improvements For Kirk & Mary Kozlowski - 266 Cliff Court - Aptos, CA 95006 - APN # 043-081-13", prepared by R.I. Engineering, dated August 2021, intended scale of publcaion is 1"=10'.

EARTHWORK AND GRADING

1. WORK SHALL CONSIST OF ALL CLEARING, GRUBBING, STRIPPING, PREPARATION OF LAND TO BE FILLED, EXCAVATION, SPREADING, COMPACTION AND CONTROL OF FILL, AND ALL SUBSIDIARY WORK NECESSARY TO COMPLETE THE GRADING TO CONFORM TO THE LINES, GRADES, AND SLOPES, AS SHOWN ON THE APPROVED PLANS.
2. ALL GRADING OPERATIONS SHALL CONFORM TO SECTION 19 OF THE CALTRANS STANDARD SPECIFICATIONS, AND SHALL ALSO BE DONE IN CONFORMANCE WITH THE REQUIREMENTS OF THE COUNTY OF SANTA CRUZ. THE MOST STRINGENT GUIDELINE SHALL PREVAIL.
3. REFERENCE IS MADE TO THE GEOTECHNICAL INVESTIGATIONS BY PACIFIC CREST ENGINEERING., ENTITLED "266 CLIFF COURT," DATED MAY 22, 2021. THE CONTRACTOR SHALL MAKE A THOROUGH REVIEW OF THIS REPORT AND SHALL FOLLOW ALL RECOMMENDATIONS THEREIN. THE CONTRACTOR SHALL CONTACT PACIFIC CREST ENGINEERING. FOR ANY CLARIFICATIONS NECESSARY PRIOR TO PROCEEDING WITH THE WORK.
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7. ENGINEERED FILL SHOULD BE PLACED IN THIN LIFTS NOT EXCEEDING 8" IN LOOSE THICKNESS, MOISTURE CONDITIONED, AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION.
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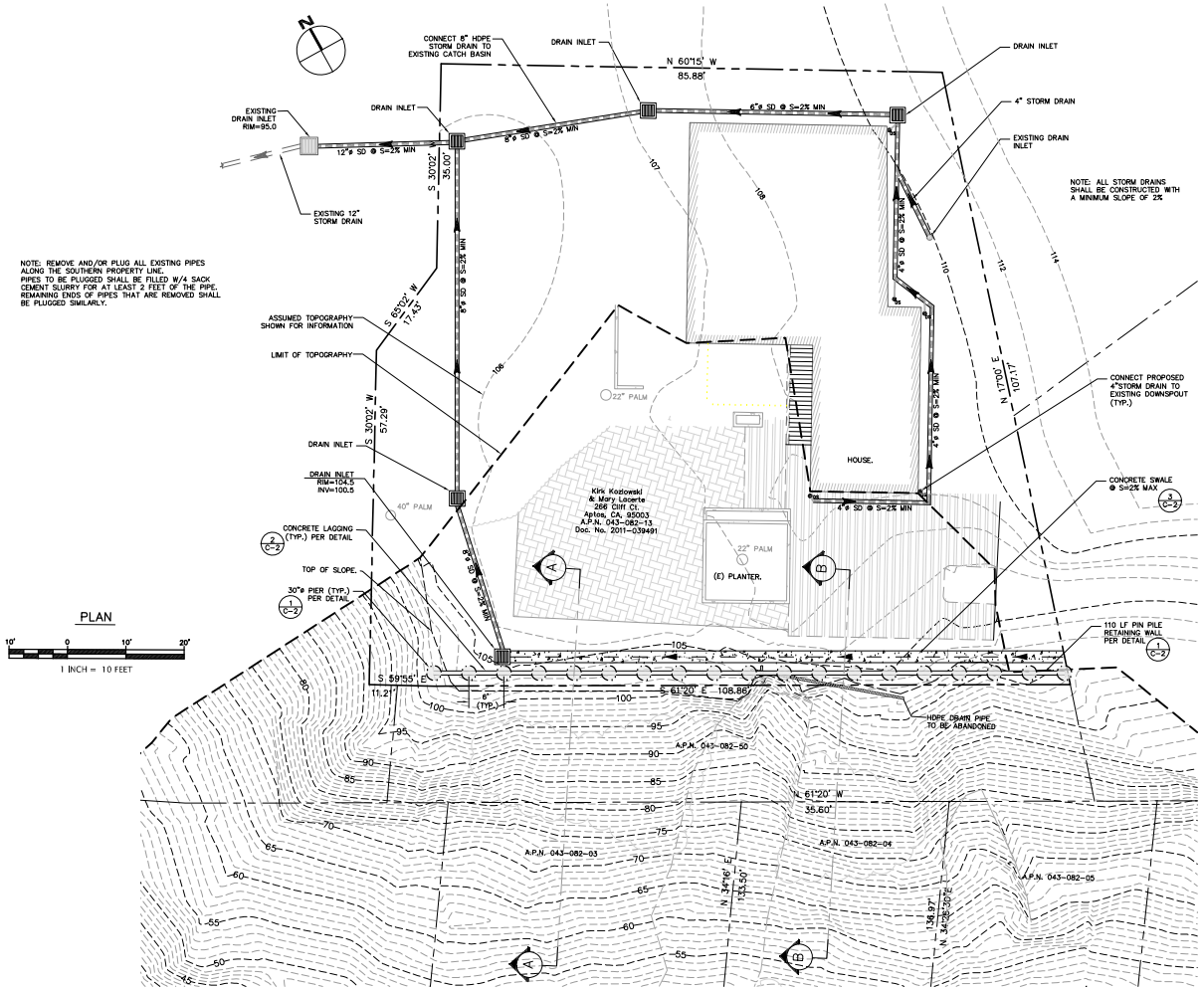
11. BARE GROUND WITHIN 10' OF FOUNDATIONS SHALL BE SLOPED AWAY @ 5% MINIMUM OR 2% MINIMUM FOR PAVED SURFACES.

PLANNING SUBMITTAL

APPENDIX B – R.I. ENGINEERING GRADING & DRAINAGE PLANS

Exhibit F

Exhibit F



PLAN

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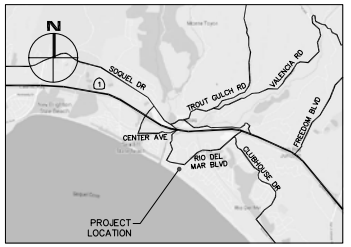

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PLANNING SUBMITTAL

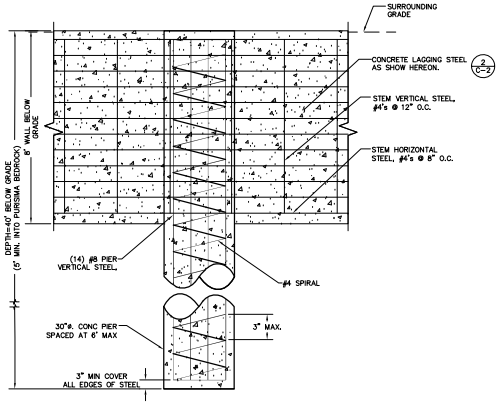
R.I. Engineering, Inc.
303 Potrero St., Suite 42-202, Santa Cruz, CA 95060
831-425-3901 www.riengineering.com

SITE IMPROVEMENTS
FOR:
KIRK & MARY KOZLOWSKI
266 CLIFF COURT
APTOS, CA 95003
APN # 043-081-13

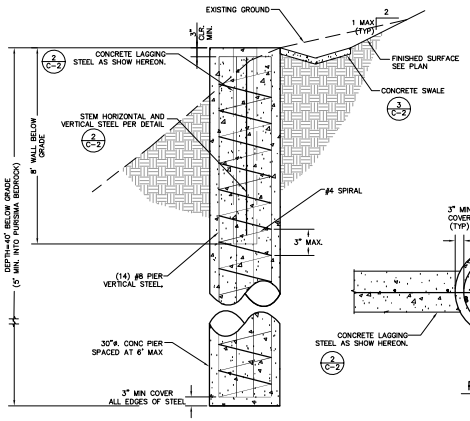
GRADING & DRAINAGE PLAN

project no.
20-074-1
date
AUGUST 2021
scale
AS SHOWN
dwg name
CIVIL1.dwg

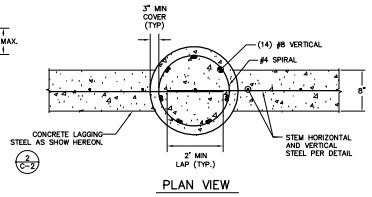
C-1



ELEVATION VIEW



SECTION VIEW



PLAN VIEW

PIN PIER WALL & CONCRETE LAGGING (1/C-2)
NTS

SPECIFICATIONS

1. CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH CBC SECTION 1905 AND ACI 301.

2. CONCRETE SHALL BE TYPE V AND HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 4,500 PSI. CONCRETE SHALL HAVE A MAXIMUM WATER TO CEMENT RATIO OF 0.50.

3. STEEL REINFORCING SHALL CONFORM TO ASTM DESIGNATION A614, GRADE 60.

4. PLACEMENT AND HANDLING OF STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF SECTION 52, "REINFORCEMENT OF THE CALTRANS STANDARD SPECIFICATIONS.

5. ANCHOR BOLTS SHALL CONFORM TO ASTM DESIGNATION A 307 OR ASTM DESIGNATION A36. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN CONFORMANCE WITH SECTION 75-1.05 "GALVANIZING" OF THE CALTRANS STANDARD SPECIFICATIONS.

6. TIMBER CONNECTORS, SHEAR WALL HOLD DOWNS AND OTHER METAL FASTENINGS SHALL BE SIMPSON STRONG TIE COMPANY CONNECTORS OR APPROVED EQUAL. FASTERERS SHALL BE HOT DIP GALVANIZED.

8. EXPOSED POSTS SHALL BE PRESSURE TREATED DOUG FIR LARCH NO.1 OR APPROVED EQUAL.

9. STRUCTURAL LUMBER SHALL BE DOUGLAS FIR-LARCH OR EQUAL. LUMBER AND TIMBER SHALL BE OF THE STRESS GRADE SHOWN ON THE PLANS IF NO DESIGNATION IS SHOWN ON THE PLANS ALL COLUMNS, BEAMS, GIRDERS, JOISTS AND PURLINS SHALL BE #2 GRADE OR BETTER. STRUCTURAL TIMBERS SHALL BE GRADED IN ACCORDANCE WITH THE CURRENT STANDARD GRADING PRACTICES ADOPTED BY THE WESTERN WOOD PRODUCTS ASSOCIATION. ALL SIZES SHOWN ON THE PLANS SHALL REFER TO NOMINAL SIZES, UNLESS OTHERWISE NOTED.

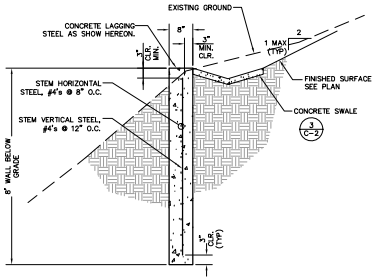
10. PRESERVATIVE TREATMENT OF LUMBER SHALL CONFORM TO THE REQUIREMENTS OF SECTION 58 OF THE CALTRANS STANDARD SPECIFICATIONS. CUT ENDS AND EXPOSED PORTIONS OF PRESSURE TREATED LUMBER SHALL BE IMMERSED A MINIMUM OF 6" INTO PRESERVATIVE SOLUTION. GUARDRAIL POSTS AND BLOCKS SHALL MET THE REQUIREMENTS OF CALTRANS CURRENT SPECIFICATIONS AND THESE PLANS. WHICHEVER STANDARD IS MORE STRINGENT SHALL APPLY.

12. NOTE DOCUMENTATION SHALL BE PROVIDED THAT VERIFIES I-BEAM SOLDER PILES COMPLY WITH THE REQUIREMENTS OF THE AISC 360 AS SPECIFIED IN CBC, SECTION 2205.1

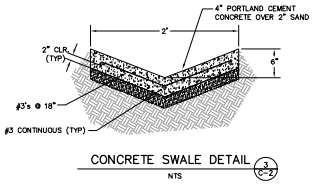
13. STRUCTURAL STEEL SHALL CONFORM TO ASTM DESIGNATION A36 AND SHALL HAVE A MINIMUM ALLOWABLE BENDING STRESS OF 36,000 PSI. BOLTED AND WELDED CONNECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE 2016 CALIFORNIA BUILDING CODE AND THESE SPECIFICATIONS.

14. WELDED CONNECTIONS SHALL MEET THE REQUIREMENTS OF FEMA 350 AND THE 2001 CALIFORNIA BUILDING CODE CHAPTER 22, "STEEL."

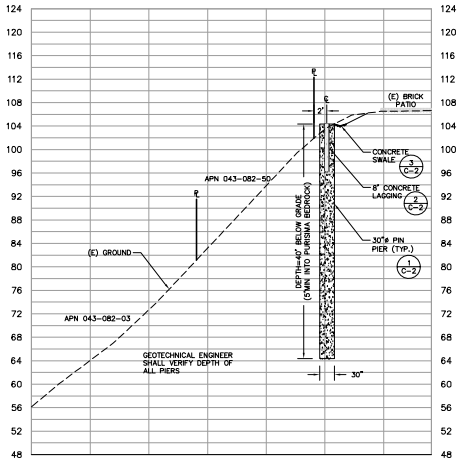
15. ALL NAILS AND ANCHOR BOLTS THAT WILL BE IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE HOT-DIPPED GALVANIZED PER ASTM A153. FASTENERS AND CONNECTORS EXPOSED TO WET WEATHER SHALL BE STAINLESS STEEL, TYPE A304



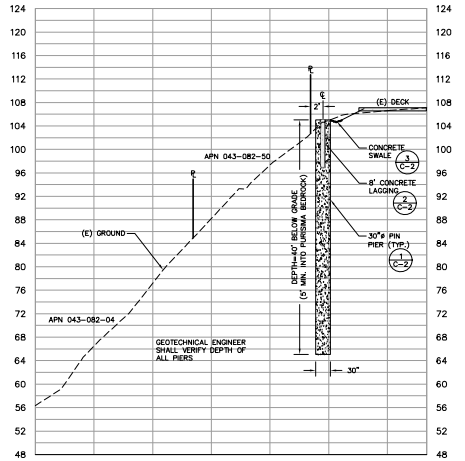
CONCRETE LAGGING SECTION (2/C-2)
NTS



CONCRETE SWALE DETAIL (3/C-2)
NTS



SECTION A-A
SCALE: 1"=10' HORIZONTAL, VERTICAL



SECTION B-B
SCALE: 1"=10' HORIZONTAL, VERTICAL

PLANNING SUBMITTAL

R.J. Engineering, Inc.
303 Potrero St., Suite 42-202, Santa Cruz, CA 95060
831-425-3901 www.rjengineering.com

SITE IMPROVEMENTS
FOR
KRIK & MARY KOZLOWSKI
286 CLIFF DRIVE
APTOS, CA 95003
APN # 043-081-13

DETAILS

project no.
20-074-1
date
AUGUST 2021
scale
AS SHOWN
dwg name
CIVIL1.dwg

C-2

8/30/2021

32

Exhibit F

County of Santa Cruz

Department of Community Development and Infrastructure

701 Ocean Street, Fourth Floor, Santa Cruz, CA 95060
Planning (831) 454-2580 Public Works (831) 454-2160
sccoplanning.com dpw.co.santa-cruz.ca.us

12 July 2023

Kirk and Mary Kozlowski
139 Vineyard Court
Los Gatos, CA 95032

Subject: Review of the Alternatives Analysis for 266 Cliff Court, Aptos, CA, County of Santa Cruz, APN 043-081-13 dated 6 June 2023 by Pacific Crest Engineering, Inc. Project No. 2008

Project Site: 266 Cliff Court
APN 043-081-13
Application No. 211508

Dear Applicants:

The purpose of this letter is to inform you that the Planning Division of the Department of Community Development and Infrastructure has reviewed the geotechnical engineering and engineering geologic aspects of the subject Alternatives Analysis report. There are a range of issues discussed in the alternatives analysis letter that are outside the scope of a strict alternatives analysis, including an abbreviated project history, a discussion related to interpretation of County Code, and a "threat analysis". Our review does not respond to these portions of the alternatives analysis and our lack of comment on these sections should not be construed as an acceptance of the opinions expressed in those sections. However, there is one aspect of the extended discussion that warrants comment here.

As the geologic and geotechnical consultants for the project have stated in their reports and in the alternatives analysis, the proposed project will not remove the threat of future landsliding posed to the homes at the base of the bluff. While it may reduce the overall landslide threat to some extent, it would not have prevented the 2019 or 2023 landslides that impacted these homes, and it will not prevent future landslides from impacting the homes. It is important for homeowners at the base of the bluff to understand that if the proposed project is constructed, their homes will continue to face a landslide threat.

The alternatives analysis proposes six alternatives ranging from no project (alternative 1) to the currently proposed retaining structure (alternative 6) and includes additional alternative measures to reduce the landslide hazard posed to the homes at the base of the cliff. The alternatives analysis lists as the project objectives: 1) preventing soils on the Kozlowski property

Exhibit G

from impacting downslope homes, and (2) employing a design that is constructed entirely on the Kozlowski property. Given the applicant's defined project objectives, only alternatives 5 (drainage improvements at the top of the bluff) and alternative 6 (the proposed retaining structure) meet the restrictions of the project objectives. Of the two alternatives, alternative 6 is judged to be the more effective solution (alternative 6 will also include the drainage improvements of alternative 5.)

Alternatives 2 through 4 involve constructing measures located off the Kozlowski property that are designed to reduce or eliminate landside hazard to the homes at the base of the bluff. Alternatives 3 and 4, if designed and constructed properly, would largely eliminate landslide hazard posed to homes at the base of the bluff, but these alternatives do not satisfy the project objective (2), i.e., being constructed entirely on the Kozlowski property.

The alternatives analysis provides a suitable range of alternatives and discussion of relative merits and drawbacks of each alternative and is accepted. Our comments are as follows:

1. The proposed project consists of the construction of a coastal blufftop soil pin type retaining wall along the seaward perimeter of the project site parcel consisting of closely spaced drilled piers tied to an 8 feet deep (below grade) concrete retaining wall. Ongoing monitoring and maintenance of the proposed blufftop soil pin type retaining wall system will be required. As the bluff face recedes, the piers below the retaining wall will become exposed and the soil exposed between the piers must be protected from erosion in order to maintain the integrity of the blufftop retaining wall system. A common form of lagging utilized for maintenance of soil pin walls is reinforced shotcrete with the rebar dowelled into the adjacent exposed piers;

2. The 1 September 2021 project site Focused Geologic Investigation report by Zinn Geology presents an anticipated bluff face landslide scenario with the blufftop receding to an approximate 30˚ angle, see the attached Zinn Geology blufftop cross sections. The proposed blufftop soil pin retaining wall will contain the blufftop soils landward of the proposed wall alignment and prevent these soils from cascading down the bluff face to impact the residences below;

3. The current project civil engineering plans by R. I. Engineering, Inc. dated June 2021 show a soil pin retaining wall system with 30-inch diameter piers spaced at 2.5 diameters on center and an 8 feet deep grade beam/buried retaining wall between the piers immediately adjacent the 266 Cliff Drive seaward parcel line. The accepted project site geotechnical report recommends a 4 feet deep grade beam between the piers. Construction of the proposed 8 feet deep buried retaining wall system immediately inboard of the parcel line has the potential to destabilize the adjacent seaward parcel soils.

Exhibit G

The potential effects of extending the depth of the wall beyond 4 feet below existing grade should be addressed the project geologist and geotechnical engineer to prevent destabilizing the adjacent seaward parcel or requiring the wall to be moved landward of the parcel perimeter which would reduce the effectiveness of the wall.

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: *https://www.sccoplanning.com/PlanningHome/ZoningDevelopment/Appeals/PlanningAppealsforDiscretionaryPermits.aspx*

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

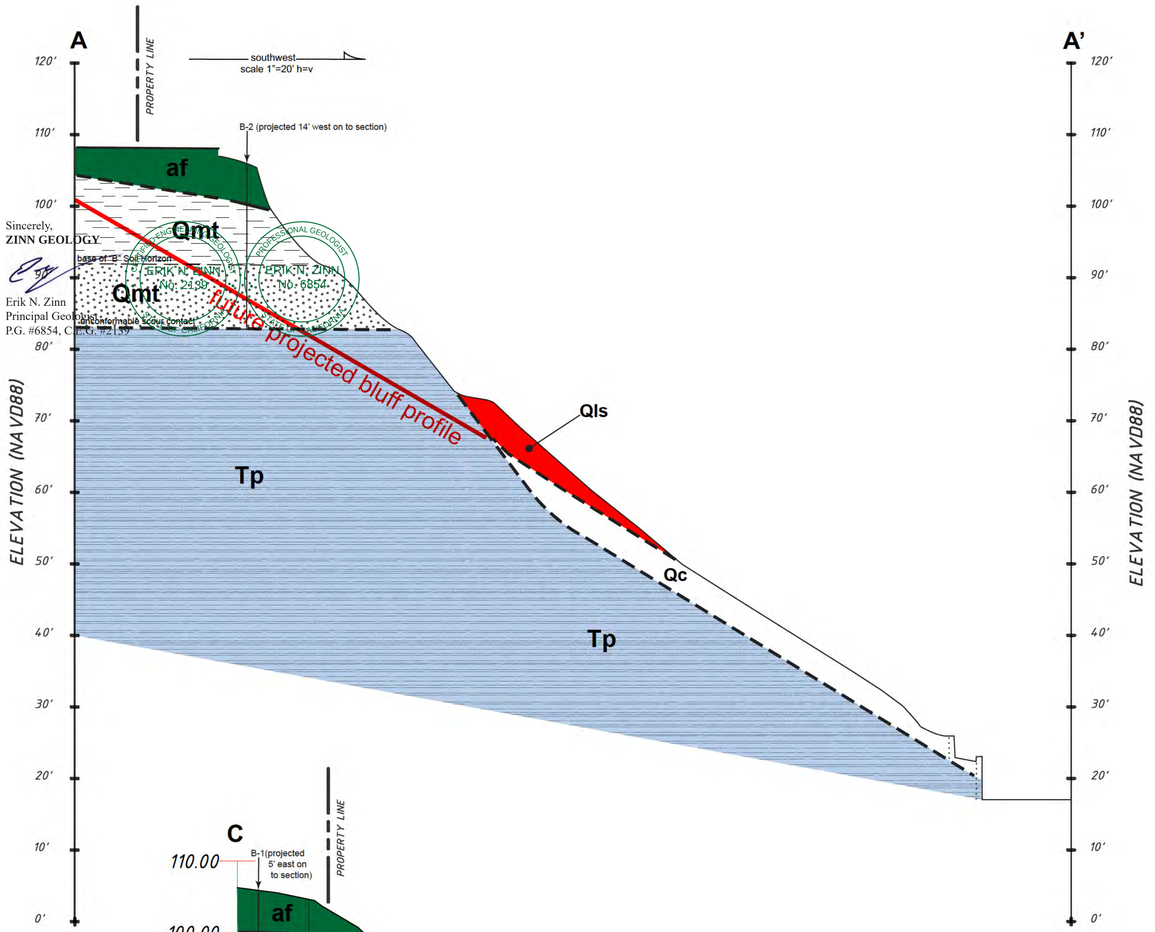
Respectfully,

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

Jeffrey Nolan, CEG 2247
County Geologist– Environmental Planning
County of Santa Cruz Planning Division

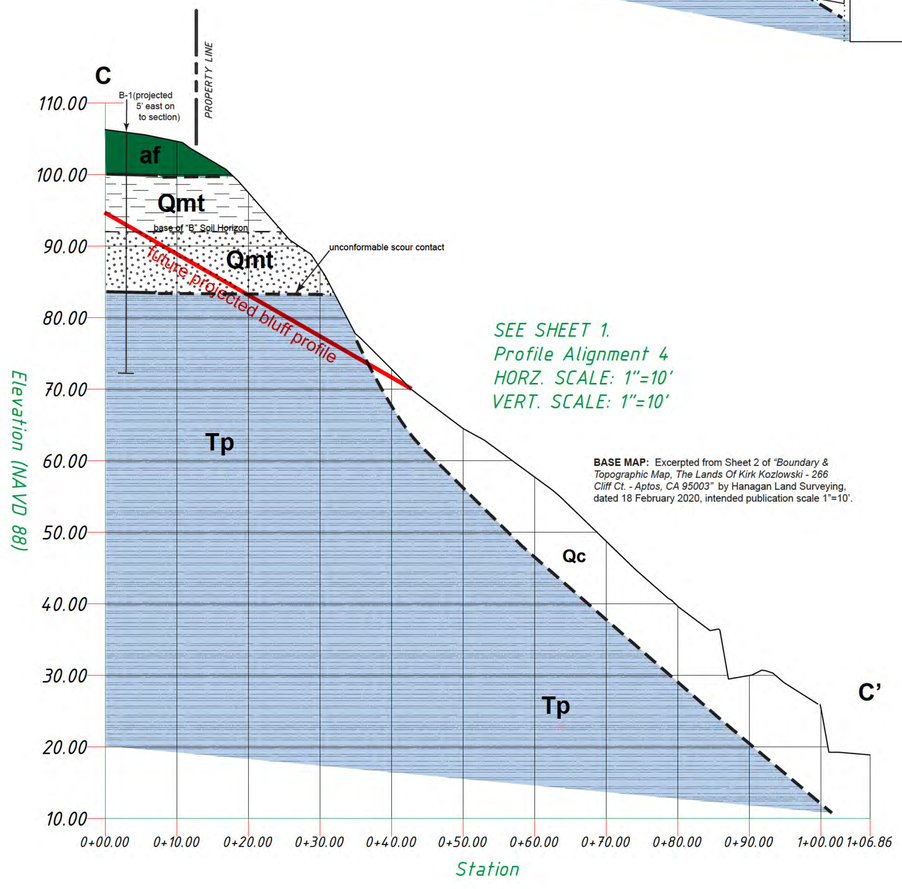
Cc: Jessica deGrassi
Evan Ditmars
Pacific Crest Engineering, Inc., Attn: Erik Zinn, CEG
Pacific Crest Engineering, Inc., Attn: Soma Goresky, GE
Primary Contact: Cove Britton, Architect

Attachment: Zinn Geology Blufftop Cross Sections



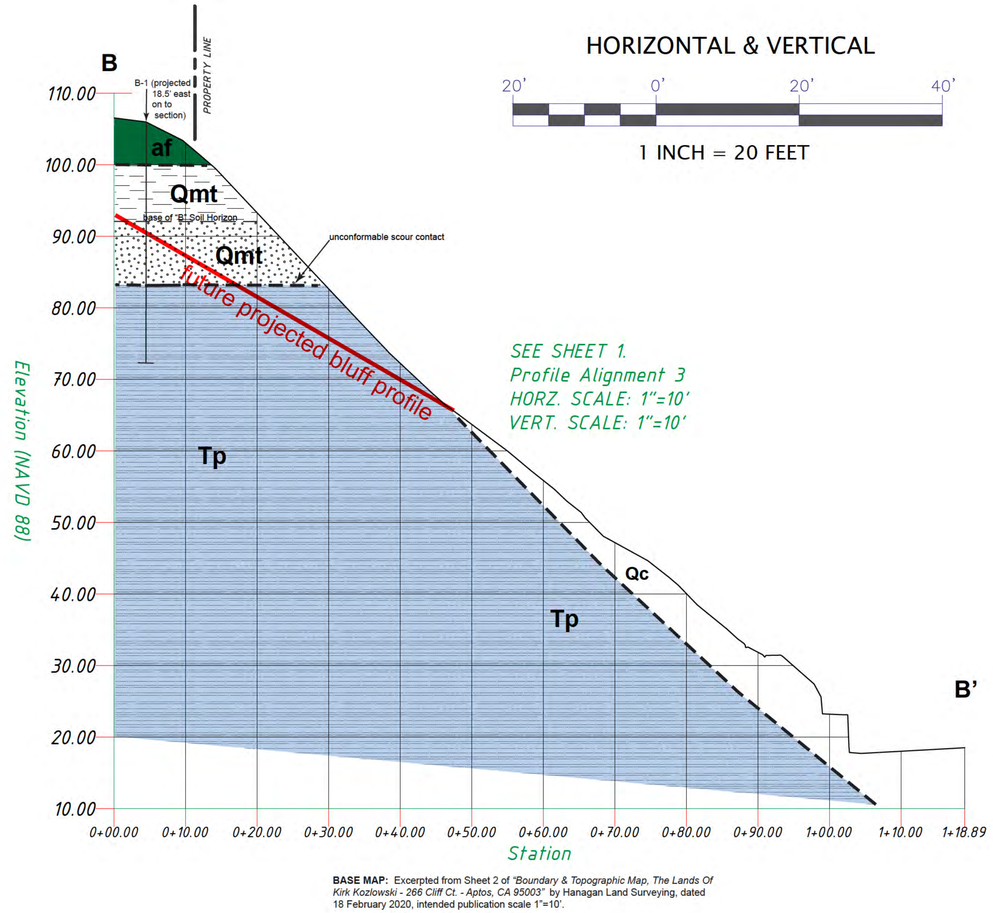
Sincerely,
ZINN GEOLOGY

Erik N. Zinn
Principal Geologist
P.G. #6854, C.E.G. #2139



SEE SHEET 1.
Profile Alignment 4
HORZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

BASE MAP: Excerpted from Sheet 2 of *"Boundary & Topographic Map, The Lands Of Kirk Kozlowski - 266 Cliff Ct. - Aptos, CA 95003"* by Hanagan Land Surveying, dated 18 February 2020, intended publication scale 1"=10'.



SEE SHEET 1.
Profile Alignment 3
HORZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

BASE MAP: Excerpted from Sheet 2 of *"Boundary & Topographic Map, The Lands Of Kirk Kozlowski - 266 Cliff Ct. - Aptos, CA 95003"* by Hanagan Land Surveying, dated 18 February 2020, intended publication scale 1"=10'.

Basis of Elevation

County Benchmark No. 476,
Elevation = 13.40', NAVD 88.

The contour interval is 1 foot.

EXPLANATION

EARTH MATERIALS

Qls	Landslide deposit
Qc	Colluvium
af	Artificial fill
Qmt	Marine terrace deposit
Tp	Purisima Formation

SYMBOLS

Earth materials contact - dashed where approximate, queried where uncertain

B-2

Location of small-diameter exploratory test borings advanced by Pacific Crest Engineering - see their report for logs of borings

CERTIFIED ENGINEERING GEOLOGIST · ERIK N. ZINN No. 2139 · STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST · ERIK N. ZINN No. 6854 · STATE OF CALIFORNIA

ZINN GEOLOGY
2351 46th Avenue
Santa Cruz, CA 95062
Tel. 831.334.4833
enzinn@gmail.com

Geological Cross Sections
Lands of Kozlowski
266 Cliff Court
Aptos, California 95003

Date: 3 March 2021	Revised: 1 September 2021
Job #2020001-G-SC	
Scale: 1"=10', h=v	**Plate 2**
Drawn by: ENZ	

Exhibit G
Attachment 1

County of Santa Cruz

DEPARTMENT OF COMMUNITY DEVELOPMENT AND INFRASTRUCTURE

701 OCEAN STREET, FOURTH FLOOR, SANTA CRUZ, CA 95060-4070
Planning (831) 454-2580 Public Works (831) 454-2160

MEMORANDUM

Date: July 18, 2023

To: Zoning Administrator

CC: Evan Ditmars, Jocelyn Drake, Matt Johnston, Kent Edler, Rick Parks, Jessica deGrassi

From: Jeff Nolan

Re: Memorandum on 266 Cliff Court Retaining Wall Application No. 211316

There have been a number of claims made by the applicant in the hearings before the Zoning Administrator, the Planning Commission, and the Board of Supervisors with regard to the retaining wall application for 266 Cliff Court. These claims need to be addressed in greater detail than was possible during the hearings. In addition, some aspects of the project have not received the scrutiny that is due. My comments are summarized below.

1. **Protection to downslope homes**
   The proposed retaining structure will not by itself protect the homes at the base of the bluff from landslide hazard (the term landsliding is used here to include debris flows and other types of slope movement). The proposed retaining structure is an underground row of concrete pins at the crest of the bluff. Landslides impacting the homes at the base of the bluff typically originate from the face of the bluff, which would not be retained by the proposed structure. This fact is explicit in the technical reports submitted by the applicant in support of the proposed retaining structure. The alternatives analysis report for the project (Pacific Crest Engineering, June 6, 2023, Attachment 1) provides six possible alternative projects, of which the presently proposed project is number 6. In the report, alternative 6 (page 8, Attachment 1) is described in this manner:

   > "This alternative consists of constructing a row of soldier piles installed just behind the top of the bluff (entirely on the Kozlowski property) with returns at both ends that is designed to act as a continuous retaining wall through the mechanism of soil arching. The piers are typically "stitched" together with a reinforced grade beam at and slightly below the ground surface. *This retaining system will only retain the soil upslope of the piers, so the soil downslope of the piers will continue to fail.* It will be necessary to install lagging between exposed piers as the *soil downslope from the piers continues to fail over time.* (Italics added for emphasis)

Exhibit H

As noted, the soil mass below the wall will continue to fail over time, impacting homes at the toe of slope. This text is a restatement of the findings in both the original geologic report for the project (Zinn Geology, September 2021) and the original geotechnical report (Pacific Crest Engineering, April 2021). As stated in the original geotechnical report for the project by Pacific Crest Engineering (report of April 2021, page 10):

> "It must be understood that the soldier piles will **not** stabilize the hillside downslope of the piers and that it should be anticipated that the area downslope of the piers will continue to fail." (Bold and underlined text from the original report)

In contrast to the description of alternative 6, the presently proposed project, is the description of alternative 4, construction of debris flow impact structures at the base of the bluff (Attachment 1, page 7):

> "Construction of flexible shallow landslide barriers, such as the Geobrugg Shallow Landslide Barriers SL or debris flow impact walls *would mitigate the debris flow risk to the residences along Beach Drive*. These structures are designed to stop and capture debris flows and prevent them from striking roads and buildings." (Italics added for emphasis)

The unqualified affirmative statement on protection of the homes at the base of the bluff here in alternative 4 stands in contrast to the description of alternative 6. If the homeowners at the base of the bluff want to protect their homes from future landsliding, they will have to install debris flow protection measures on the slopes behind their homes.

2. **Ongoing landsliding below project site**

The alternatives analysis states that "The proposed pin pier wall will clearly contribute to a *portion* of the ongoing life-safety issue presented to the residences below" (Attachment 1, Page 5, italics added). Accepting that the proposed wall on the Kozlowski property will not provide full protection against future landslides, how much will it actually contribute to life-safety at the toe of the bluff?

A recent photograph of the bluff is included here as Attachment 2. On that photograph are indicated: (1) the source location of the 2019 landslide that impacted the homes at the toe of the bluff, (2) the approximate source locations of the recent landslides that impacted the homes at the bluff toe, and (3) the proposed location of the Kozlowski retaining structure. As can be seen in the photo, recent landslides originated in soils in front of (downhill from) the proposed retaining wall. Neither the 2019 landslide nor the 2023 landslide would have been prevented by the proposed retaining structure. Nor will future landslides originating from the material in front of the proposed structure be prevented by the proposed structure, as noted by both the Zinn Geology and Pacific Crest Engineering reports.

Attachment 3 is a set of geologic cross sections prepared for the project by the applicant's geologist, Zinn Geology. The geologic cross sections are depictions of what would be seen on a vertical slice through the bluff oriented perpendicular to the bluff face. The approximate location of the proposed retaining structure has been added to the original illustrations. As can be seen from the cross sections, a large amount of soil exists in front of the wall, enough to generate several generations of landsliding of the type observed in 2019 and 2023.

The proposed structure will eventually help retain earth material that might form landslides, but probably only after multiple landslides have removed earth from in front of the structure. However, that future scenario presents its own problems. Eventually, soil will be removed from the front of the structure by landsliding and/or erosion and the structure will become a freestanding retaining wall up to 16' high (or potentially more) that will be retaining a significant amount of soil that could threaten the homes below. At that point, it will have to be upgraded with lagging to bridge the gaps between the concrete pins and maintained in stable condition or it will pose a significant, and perhaps elevated threat to the homes below. The problem with this scenario is that the future homeowners at the base of the slope may not have authority to maintain the wall and may depend for the safety of their homes on the largesse of the bluff top property owner to maintain the wall. Any retaining wall at the crest of the bluff would have to be maintained in perpetuity or it may pose a significant hazard to the homes at the toe of the bluff. As stated in the original geotechnical report by Pacific Geotechnical Engineering (report of April 22, 2021, page 10):

> "It may be necessary to place lagging between the piers to prevent erosion or raveling if slope retreat exposes the section of the piers below the grade beam. If downhill slope retreat exposes the soldier piers, Pacific Crest Engineering Inc. should be consulted in order to provide supplemental measures, as necessary."

If the objective is to protect the homes at the base of the bluff, the proposed retaining wall is not an effective solution. In the nearer term (probably the next few decades) it will provide little protection to homes at the base of the bluff. In the longer term, the large retaining wall that results from erosion of the bluff face could pose an elevated hazard to homes below. The wall will provide effective protection for valuable real estate at the top of the bluff and may help reduce the exposure of the upslope property owners to lawsuits when future landslides impact the homes at the base of the bluff.

3. **Historical landsliding**

The County has been concerned with the safety of homes at the toe of the bluff for quite some time. For about the last 30 years the County has required all new homes and major remodels of homes at the toe of the bluff to include some form of protection from landslides originating on the bluff. Additionally, the County has in some cases required landslide protection to be constructed for homes that have been posted unsafe to occupy because of being impacted by landslides from the bluff. The County has stopped short of requiring all homes at the base of the bluff to construct landslide protection measures and it is likely that the County lacks the authority to do so.

4. **Project objectives**

The impression created by the applicant's presentation at the various appeals hearings is that the purpose of the wall is to protect the homes at the base of the bluff. It is clear from the statements of purpose in the original geologic and geotechnical reports that the primary stated purpose of the proposed retaining structure was to protect the Kozlowskis from future lawsuits. The original geologic report simply states:

> "PROJECT OBJECTIVES

> The Kozlowskis do not want to be sued in the future for landslides issuing out of the bluff and striking the houses below, whether the landslides are truly triggered by water or soil from their property, or whether the Beach Drive homeowners simply perceive that the landslides were triggered by mismanagement of soil and water on the Kozlowskis property. Subsequently, we have been asked to provide the geological input to the design team for a soil retention system."

The geotechnical report similarly states:

> " Mr. and Mrs. Kozlowski wish to limit their future liability from the Beach Drive homeowners by constructing a soil retention system along their southwest property boundary. The purpose of the retention system will be to confine, as much as possible, the bluff materials on their property in order to keep them from impacting downslope residential properties."

The technical documents supporting the project do mention health and safety but are careful to limit their stated project objectives to preventing "*the soil and water owned by the Kozlowski's* from striking the residences" at the base of the bluff. The proposed retaining structure may help protect the Kozlowskis from future legal liabilities for landsliding from the bluff, although it will not provide effective protection for the homes at the base of the bluff.

5. **Shoreline protection structures**

The applicant's consultants have argued repeatedly that the definition of a shoreline protection structure in the County Code Section 16.10.040(59) is incorrect and that it should be defined in a different way, such that the proposed retaining structure would not be considered a shoreline protection structure. The definition provided by County Code is:

> "Shoreline protection structure" means any structure or material, including but not limited to riprap or a seawall, *placed in an area where coastal processes operate*."

The definition of coastal erosion processes in County Code Section 16.10.040(12) is:

> "Coastal erosion processes" means natural forces that cause the breakdown and transportation of earth or rock materials on or along beaches and **bluffs** (emphasis added.) These forces include **landsliding,** surface runoff, wave action and tsunamis." [Emphasis added]

As observed by the applicant's geotechnical engineer, Pacific Crest Engineering (report of April 22, 2021, page 9):

> "Landsliding/Coastal Bluff Retreat: *The coastal bluff that abuts the southwest side of the property appears to be actively subject to on-going coastal processes of shallow landsliding and erosion*. These processes will continue to contribute to the long-term bluff retreat." (Italics added)

Clearly there is agreement that the bluff where the retaining structure is proposed is a place where coastal processes operate, and the retaining structure as sited clearly qualifies as a

shoreline protection structure as defined by Code. The duty of County staff is to enforce County Code provisions. The proposed retaining structure is a shoreline protection structure as defined by Code.

Attachments:

1. Alternatives Analysis

2. Photograph of bluff with annotations

3. Geology Report Cross Sections with annotations

Exhibit H

6 June 2023 Project No. 2008

Kirk and Mary Kozlowski
139 Vineyard Court
Los Gatos, CA 95032

Re: **Alternatives Analysis**
266 Cliff Court
Aptos, California
County of Santa Cruz, A.P.N. 043-081-13
Coastal Development Permit Application 211316

Dear Kirk and Mary,

This report is intended to respond to the County of Santa Cruz Planning Commission (CSCPC) request to summarize the alternatives for engineered mitigation schemes for future debris flow flows issuing out of the portion of the coastal bluff owned by you and striking the residences (constructed between 1932 and 1964) below on Beach Drive. The request came by a passed motion made by Commissioners Schiffrin and Gordin in the 22 March 2023 hearing. Their motion flowed from a discussion by the Commissioners and County staff in the 22 March 2023 hearing regarding the possibility of continuing the application to the next CSCPC hearing (26 April 2023), at which point the application would be continued a second time in order to allow for an appropriate amount of time for completion of the alternatives analysis by our firm and the subsequent review by County of Santa Cruz staff (Audio for CSCPC 22 March 2023 hearing).

It appears that the Planning Commission then denied the application without prejudice in the 26 April 2023 hearing (Minutes from 26 April 2023 CSCPC hearing) despite a formal request for a continuance and contrary to the agreed upon sequence of events for the application made in the 22 March 2023 hearing.

We have nonetheless prepared this alternatives analysis pursuant to the agreement made in the 22 March 2023 hearing.

PROJECT DESCRIPTION

The application for this project was filed to construct approximately 110 feet of pin pier retaining wall only on the owner's property and to make drainage improvements to the property that redirect stormwater away from the seaward edge of the property (see attached August 2021 civil engineering plans by R.I. Engineering).

Exhibit H
Attachment 1

INTRODUCTION/HISTORY

The following documents were produced for this project by both the consultant team and the County of Santa Cruz:

Date	Report	By
2/18/2020	Topographic map and sections	Hanagan Land Surveying
4/22/2021	Geotechnical Investigation - Design Phase	Pacific Crest Engineering
8/20/2021	Civil Engineering Plans	R.I. Engineering
9/1/2021	Focused geologic investigation of coastal erosion and landsliding	Zinn Geology
10/26/2021	County Agency Comments	County of Santa Cruz
10/29/2021	County completeness letter	County of Santa Cruz
1/12/2022	Response to Discretionary Application Comments letter	R.I. Engineering
3/17/2022	County Letter Of Acceptance For Geology and Geotech reports	County of Santa Cruz
4/20/2022	Incomplete Application – Additional Information Required letter	County of Santa Cruz
5/3/2022	Appeal of Notice of Incomplete Application letter	Nossaman
6/15/2022	Complete application submittal letter	County of Santa Cruz
9/14/2022	Pin Pier Wall Comments	R.I. Engineering
11/16/2022	Response to County Staff Report	Pacific Crest Engineering
11/17/2022	Civil engineering letter for ZA hearing	R.I. Engineering
11/18/2022	County staff report for ZA hearing	County of Santa Cruz
12/16/2022	Staff Report to the Zoning Administrator	County of Santa Cruz
12/22/2022	Appeal of Zoning Administrator decision letter	Nossaman
1/27/2023	Appeal from January 19, 2023 Decision of Mr. Matt Machado letter	Nossaman
2/3/2023	Cliff Court BAFCAB Appeal Response letter	County of Santa Cruz
3/15/2023	Letter regarding soil volume to be retained	Pacific Crest Engineering
3/22/2023	County staff report	County of Santa Cruz
4/26/2023	County staff memorandum	County of Santa Cruz
4/27/2023	Engineering drainage plans for Emergency Coastal Development Permit	R.I. Engineering
6/6/2023	Memo regarding proposed pin pier wall	R.I. Engineering

We have provided a distilled historical synopsis of the design and application process below. The distillation is by no means meant to be exhaustive. We have appended what we consider to be an exhaustive chronological compilation of the written record in Appendix C, so that the reader may consult that appendix in order to gain a more plenary understanding of the record.

A letter by Zinn Geology dated 1 September 2021 presented a distilled geological analysis of the process of terrestrial landsliding that is driving landward at the top of the bluff in front of the Kozlowski's property. It is important to note that the seaward edge of the Kozlowski's

property lies almost entirely along the top of the bluff and NOT entirely on the bluff face itself, which lies mostly seaward and is not owned by the Kozlowski's (refer to Plate 1 in Appendix A of this letter for a graphical depiction of the top of bluff with respect to the subject property line and proposed pin pier wall). Zinn Geology made findings in their 2021 letter regarding the landsliding out of the coastal bluff at this location, including the following:

2. The coastal bluff below their property has repeatedly failed incrementally in the form of debris flows and shallow landslides, some of which have struck the residences below the property.

3. The coastal bluff will continue to retreat in the future via continued incremental, piecemeal landslide events.

*6. The package of artificial fill, marine terrace deposits, Purisima Formation and colluvium will fail incrementally and repeatedly until overall the slope reaches a **conservative** slope angle of approximately 30 degrees. We have drawn this future projected bluff configuration line on our geological cross sections (Plate 2).*

Zinn Geology also noted in their 2021 letter: ***"Since the Kozlowskis do not really own the bluff face and do not have permission from the "buffer" property owner to work on that property, any system installed for this project will need to stop at the Kozlowski property line, right at the top of bluff or slightly below it."*** (bold emphasis added)

The most important recommendation from the Zinn Geology 2021 letter was:

1. The Project Geotechnical Engineer and Project Civil Engineer should design a retention system that lies on the property and will prevent the soil and weathered bedrock owned by Kirk and Mary from failing as the coastal bluff retreats, as least as much as practicable.

The Zinn Geology letter was accepted by the County of Santa Cruz peer reviewing geologist, Jeffrey Nolan on 17 March 2022. In their acceptance letter they stipulated:

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

Plans for the bluff top pin pier wall that complied with the recommendations from the 2021 Zinn Geology letter and the 2021 Pacific Crest Engineering geotechnical report were issued by R.I. Engineering in August 2021.

After a 21 March 2022 application submittal, the County of Santa Cruz issued a "Complete Application Submittal" letter dated 15 June 2022. The County indicated in that letter that *"As of May 14, 2022, this application has been considered **complete for further processing** (bold emphasis added)."*

Subsequent supplemental letters were issued by Pacific Crest Engineering and R.I. Engineering that covered different aspects of the proposed pin pier design. A 16 November 2022 letter by Pacific Crest Engineering indicated that the "pin-pile soil retention system would be an effective and reasonable measure for stabilizing bluff materials on the Kozlowski property and restrain them from impacting the downslope properties on Beach Drive". The letter also indicated that the "geotechnical recommendations were never intended to be applied to the design of a shoreline protection structure."

A 17 November 2022 letter by R.I. Engineering indicated that the proposed pin pier wall was determined to be the most feasible alternative by the design team. They also indicated that the pin pier wall was not designed to provide shoreline protection because it is not designed to resist undermining.

Another letter by Pacific Crest, dated 15 March 2023, indicated that the total calculated volume of soil that would be retained by the proposed pin pier retaining wall and prevented from striking the residences below is approximately 1000 cubic yards. It is important to note that Pacific Crest Engineering clearly indicated in that letter that this volume is unlikely to fail all at once, but will likely happen incrementally over decades, primarily in the form of debris flows.

A 22 March 2023 Planning Commission Staff Report by the County of Santa Cruz recommended denial of the project because *"…the recommendation of denial is not based solely on the proposed placement of the Applicant's retaining wall. Instead, and as discussed in the project completeness letter (Exhibit 1B, dated June 15, 2022), the submitted application was deficient in that it did not contain all required submittal materials; therefore, the submittal did not demonstrate compliance with subsections of 16.10.070(H)."*

Finally, a memo issued by R.I. Engineering, dated 6 June 2023, stipulates that their design for the proposed pin pier wall is not engineered to be a *"shoreline protection structure"*. It is important to note that R.I. Engineering is the Project Civil Engineer of Record and they have clearly communicated that their design does NOT *"meet approved engineering standards as determined through environmental review"*, as stipulated in the County of Santa Cruz Building Code section 16.10.070.H.3.f, as well as the Santa Cruz County General Plan section 6.2.16 paragraph 5 – "Shoreline protection structures shall be designed to meet approved engineering standards for the site as determined through the environmental review process."

EXISTING CONDITIONS AND SITE CONSTRAINTS

The coastal bluff in front of the Kozlowski property has failed again this past winter, resulting in a debris flow striking one of the residents below as well as depositing debris flow deposits above a retaining wall that lies directly behind the residences at 301 and 303 Beach Drive. The upper 15 feet of the bluff is now oversteepened with respect to the soil exposed in the 2023 scar. As noted in the Zinn Geology 1 September 2021 letter and the Pacific Crest

Engineering 15 March 2023, this process will continue until the upper bluff has laid back to a more stable angle.

The application submitted by the Kozlowski's is for the proposed construction of drainage improvements and construction of a pin pier wall. The primary goal of the application and the design is to prevent the soil and water owned by the Kozlowski's from moving downslope and inundating or striking the residences that lie below their property along Beach Drive.

It is not practical, nor legally supportable (as per counsel, Greg Sanders) to require the Kozlowskis to provide landslide mitigation measures off of their property for soil they do not own. County staff have not provided any basis to date for such a requirement. Furthermore, the Kozlowski's have not to date received cooperation regarding constructing a soil retention structure from the owners of the property that abuts their seaward property line.

SERIOUSNESS OF THE THREAT AND RISK TO THE DOWNSLOPE RESIDENCES

The threat analysis was covered by Zinn Geology in their 2021 letter. The Beach Drive residences (originally built between 1932 and 1964) that lie below the Kozlowski property have been struck in the past by debris flows triggered by intense rainfall and issuing out of the bluff face seaward of the Kozlowski property. This threat of future debris flows striking the residences below will continue in the future until the coastal bluff lays back to an angle that is stable for the exposed soil during intense rainfall and seismic shaking. As the bluff continues to retreat in a piecemeal fashion landward across the Kozlowski property, their soil will be a source of the debris flows that could strike the residences below. The proposed pin pier wall will clearly contribute to a portion of the ongoing life-safety issue presented to the residences below.

PROJECT OBJECTIVES

The principal objective of the proposed project is to prevent the soil and water owned by the Kozlowski's from striking the residences located directly below their property along Beach Drive.

Since the Kozlowskis do not own the bluff face (it lies seaward of their property) and do not have the requisite cooperation from the "buffer" property owner (that lies seaward of their property) to work on that property, any system installed for this project will need to stop at the Kozlowski property line, right at the top of bluff or slightly below it. So a second objective for the design is that the structure/system must be constructed entirely on the Kozlowski's property.

The storm water system is also of concern, because there are pipes on the bluff of unknown

origin that could give downslope owners the perception that the Kozlowskis are draining water down the face of the bluff. A third objective is to capture all water that falls on the Kozlowski property and direct it away from the bluff, at least as much as is practicable. It is important to note that the proposed soil retention system and changes to the storm water system are not needed to protect the existing Kozlowski residence or access to the residence. The proposed design is engineered solely to prevent the soil and water owned by the Kozlowskis from mobilizing as a debris flow and striking the residences below their property.

AVAILABLE ALTERNATIVES

Several alternatives to retaining the soil and water on the Kozlowski's property have been considered and are discussed below.

Alternative 1 – Do nothing and allow the Kozlowski's soil and water to wash/fail downslope
Alternative 2 – Attempt to arrest bluff failure with vegetation
Alternative 3 – Construct soil retention structures on the bluff from top to bottom
Alternative 4 – Construct debris flow impact structures at the base of the bluff
Alternative 5 – Deflect stormwater away from the top of the bluff on the Kozlowski property
Alternative 6 – Construct a pin pier wall on the Kozlowski property

Alternative 1 – Do nothing and allow the Kozlowski's soil and water to wash/fail downslope

If no action is taken to redirect the water and retain the soil on the Kozlowski property, the top of the bluff will continue to fail and eventually breach their seaward property line. In our opinion this may occur as soon as next winter in some locations along their seaward property line. This may result in debris flows emanating from the Kozlowski's soil striking the residences that lie below the Kozlowski property. This does not meet the first (and primary) project objective.

Alternative 2 – Attempt to arrest bluff failure with vegetation

Arresting coastal bluff failure above Beach Drive with using only planted vegetation is virtually impossible, due to the forces required to stabilize the heavy load of soil in an oversteepened face. During the winter months when the soils are wet and winds are heavy, large bluff face trees typically topple, bringing masses of soil with them. Some native vines and shrubs, such as poison oak, as well as invasive plants (pampas grass) can help to temporarily stabilize bluff face soils, but their roots are not strong or deep enough to retain saturated soil on a steep bluff face.

Since most of the Kozlowski property actually lies behind the bluff top line and they cannot encroach on the adjacent properties with a mitigation, the installation of vegetation on the bluff face is not even logistically feasible.

Therefore this alternative is not only logistically infeasible, but will not resolve the long term issue of continued debris flows issuing out of the bluff face. This alternative does not meet any of the project objectives.

Alternative 3 – Construct soil retention structures on the bluff from top to bottom

A top-to-bottom slope stabilization system installed off of and below the Kozlowski property, such as Geobrugg Tecco installed in tandem with Geobrugg Tecmat, could partially prevent their soil from failing out of the bluff and striking the residences below.

Another possibility for a top-to-bottom slope stabilization system is a soil nail wall. This system can be installed on soil slopes that are vertical to near vertical, which is the current condition of the bluff top seaward of the Kozlowski property.

Unfortunately, as noted in the prior alternative, most of the Kozlowski property actually lies behind the bluff top line and they cannot encroach on the adjacent properties with a mitigation. Therefore this alternative is not logistically feasible. This alternative does not meet the project objectives.

Alternative 4 – Construct debris flow impact structures at the base of the bluff

Construction of flexible shallow landslide barriers, such as the Geobrugg Shallow Landslide Barriers SL or debris flow impact walls would mitigate the debris flow risk to the residences along Beach Drive. These structures are designed to stop and capture debris flows and prevent them from striking roads and buildings. They would need to be located as close to the structures being protected (which are the Beach Drive residences in this case) as possible in order to capture all the permutations of potential debris flow sources. Debris flow impact structure design requires geological and geotechnical engineering investigations to characterize the potential debris flow volumes and velocities, along with foundation parameters for the impact structures.

Unfortunately this alternative would need to be installed entirely off of the Kozlowski property, which conflicts with their objective of keeping the mitigation solely on their property. Additionally, if the debris flow barrier system is overwhelmed by a large debris flow event that involves the Kozlowski's soil and water, resulting in damage to the Beach Drive residences or injury/death of the occupants, the Kozlowskis will still be liable for damages and subject to potential claims. In summary, this alternative is not logistically feasible and does not does not meet the project objectives.

Alternative 5 – Deflect stormwater away from the top of the bluff on the Kozlowski property

Construction of an engineered drainage system that captures stormwater and deflects it away from the seaward property line on the Kozlowski property will partially mitigate future debris flows emanating from the Kozlowski's soil and property.

This alternative has already been proposed in tandem with the proposed pin pier system by R.I. Engineering. R.I. Engineering has also proposed to install just the engineered drainage system as part of an Emergency Coastal Development Permit submitted in April 2023.

Relying solely on drainage improvements will not prevent the future debris flows from issuing from the bluff. The soils on the bluff face will still become saturated from storms during wet rainy seasons and fail when subjected to a debris flow rainfall threshold event. Therefore, solely relying upon this alternative will not achieve the objective of prevent the Kozlowski's soil from mobilizing as a debris flow and striking the residences below. Relying solely upon this alternative does not meet the project objectives.

Alternative 6 – Preferred Alternative - Construct a pin pier wall on the Kozlowski property

This alternative consists of constructing a row of soldier piles installed just behind the top of the bluff (entirely on the Kozlowski property) with returns at both ends that is designed to act as a continuous retaining wall through the mechanism of soil arching. The piers are typically "stitched" together with a reinforced grade beam at and slightly below the ground surface. This retaining system will only retain the soil upslope of the piers, so the soil downslope of the piers will continue to fail. It will be necessary to install lagging between exposed piers as the soil downslope from the piers continues to fail over time.

Our firm, along with R.I. Engineering has worked on this type of solution at similar locations within one mile of the Kozlowski property with County of Santa Cruz approval.

The location of the pin pier wall at the seaward property line for the Kozlowski's property **will maximize the stabilization of the soil owned by the Kozlowski's** that will fail in the future if left unretained.

This alternative can satisfy all the project objectives.

Table A (below) presents a comparative summary of the alternatives:

TABLE A: COMPARITIVE SUMMARY OF ALTERNATIVE

ALTERNATIVE NUMBER	DESCRIPTION OF ALTERNATIVE	PREVENTS KOZLOWSKI'S SOIL FROM STRIKING RESIDENCES FOR THE LONG-TERM (100-YEARS)*	MEETS PROJECT OBJECTIVES	FEASIBLE (AS DEFINED IN THE COUNTY BUILDING CODE)	IMPACTS COASTAL ACCESS
1	Do nothing and allow the Kozlowski's soil and water to wash/fail downslope	NO	NO	YES	NEGATIVE
2	Attempt to arrest bluff failure with vegetation	NO	NO	YES	NEGATIVE
3	Construct soil retention structures on the bluff from top to bottom	YES	NO	YES	NEGATIVE
4	– Construct debris flow impact structures at the base of the bluff	YES	NO	YES	NEGATIVE
5	Deflect stormwater away from the top of the bluff on the Kozlowski property	NO	NO	YES	NEGATIVE
6	Construct a pin pier wall on the Kozlowski property	YES	YES	YES	NEGATIVE

*Assumes future maintenance and repair takes place as needed

In summary, the only alternative considered in this analysis that meets all the project objectives and that is allowed by the County of Santa Cruz code is Alternative 6, the current proposed pin pier system. In our opinion, the pin pier system should be constructed along with the proposed engineered drainage system to prevent water owned by the Kozlowskis from draining seaward off their property toward the residences below along Beach Drive.

This concludes our alternatives analysis for this project. Please do not hesitate to contact us if you have any questions about this letter or our work or need further assistance.

Sincerely,

PACIFIC CREST ENGINEERING INC.

Erik N. Zinn
Principal Geologist
P.G. #6854, C.E.G. #2139

Appendix A – Annotated civil engineering site plan by R.I. Engineering
Appendix B – Civil engineering plans by R.I. Engineering
Appendix C – Historical documents related to the project

APPENDIX A – ANNOTATED CIVIL ENGINEERING SITE PLAN BY R.I. ENGINEERING

Pacific Crest
ENGINEERING INC

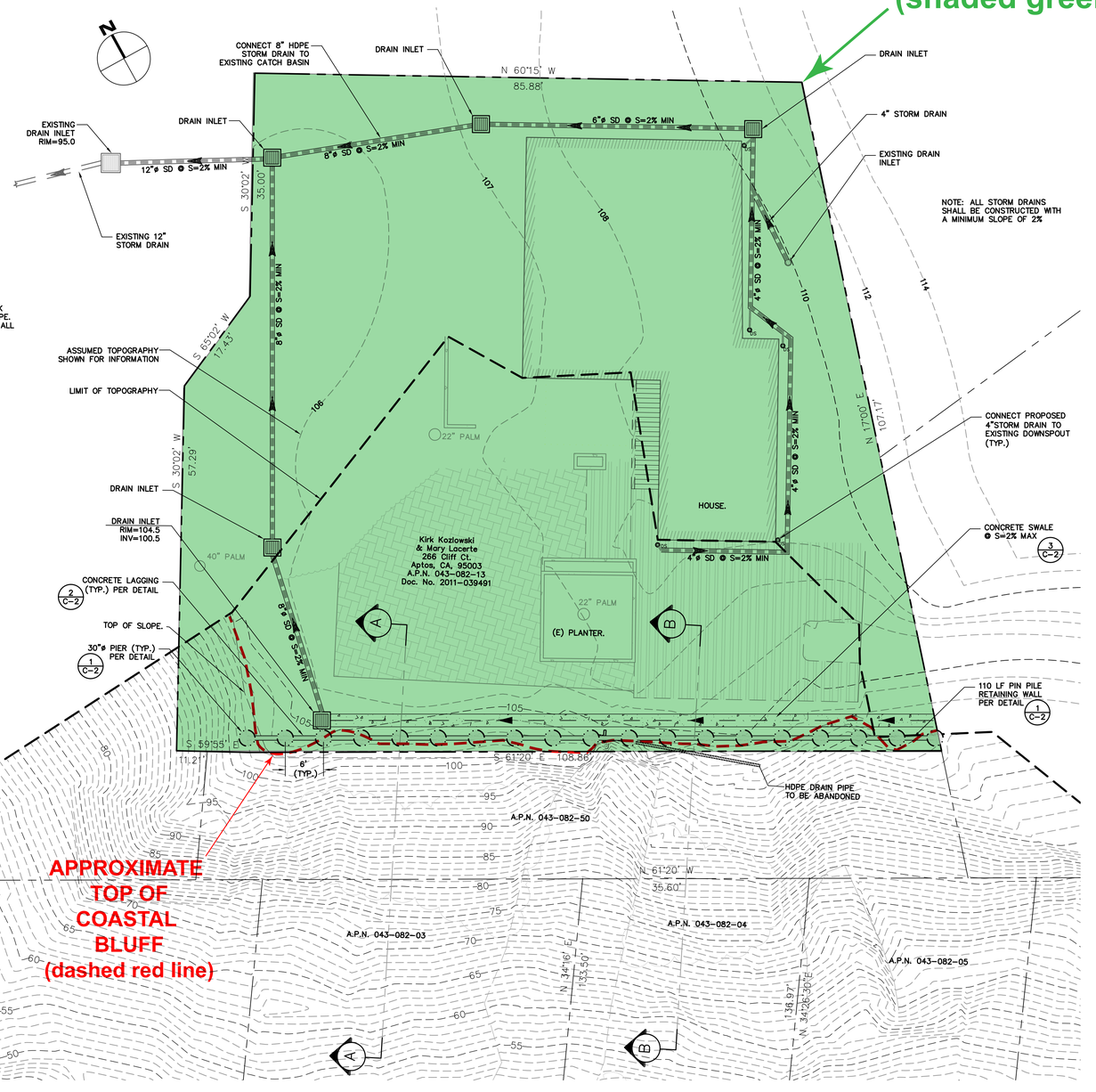
ANNOTATED CIVIL ENGINEERING SITE MAP
Kozlowski Property
266 Cliff Court
Aptos, CA 95006

Date: 6 June 2023	Revised:
Job #2008	
Scale: 1"=10'	**Plate 1**
Drawn by: ENZ/enz	

PROFESSIONAL GEOLOGIST · ERIK N. ZINN No. 6854 · STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST · ERIK N. ZINN No. 2139 · STATE OF CALIFORNIA

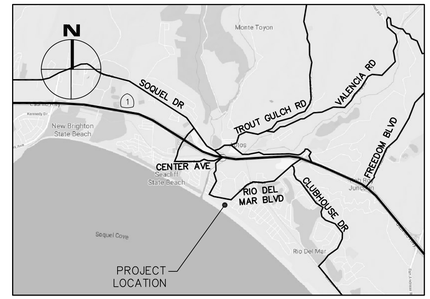
KOZLOWSKI PROPERTY (shaded green)



PLAN

10' 0 10' 20'

1 INCH = 10 FEET



VICINITY MAP
NTS

LEGEND

- (E) BRICK PATIO
- (E) DECK
- (E) CONCRETE
- PROPOSED AC
- (E) FLOWLINE
- (E) RETAINING WALL
- PROPERTY LINE
- PROPOSED SETBACK
- LIMIT OF TOPOGRAPHY
- PROPOSED CONCRETE LAGGING
- PROPOSED SWALE
- PROPOSED SD
- PROPOSED PERIMETER SD
- PROPOSED SDCO
- EXISTING CB
- PROPOSED CB
- PROPOSED PIER
- PROPOSED CONCRETE SWALE

ABBREVIATIONS

BW	BOTTOM OF WALL
CB	CATCH BASIN
CONST	CONSTRUCT
DIA, ø	DIAMETER
DS	DOWNSPOUT
DTL	DETAIL
DWY	DRIVEWAY
(E)	EXISTING
EL	ELEVATION
EOP	EDGE OF PAVEMENT
FF	FINISH FLOOR
FG	FINISH GRADE
FS	FIRE SERVICE
HP	HIGH POINT
INV	INVERT
LF	LINEAR FEET
LP	LOW POINT
MAX	MAXIMUM
N.T.S.	NOT TO SCALE
RW	RETAINING WALL
RIM	RIM ELEVATION
S	SLOPE
SCCO	COUNTY OF SANTA CRUZ
SSCO	SANITARY SEWER CLEANOUT
SDCO	STORM DRAIN CLEANOUT
TYP	TYPICAL
TW	TOP OF WALL
WS	WATER SERVICE

SEWER LATERAL NOTES

1. SEWER LATERALS SHALL BE POLYVINYL CHLORIDE (PVC SDR26) AND SHALL HAVE A SMOOTH INTERIOR.

2. SEWER LATERALS SHALL BE SLOPED AT A MINIMUM 2%

STORM DRAIN SYSTEM MAINTENANCE

THE HOME OWNER IS RESPONSIBLE FOR MAINTAINING THE STORM DRAINAGE SYSTEM AND ALL COMPONENTS. EVERY YEAR, PRIOR TO THE WET WEATHER SEASON (OCTOBER 15TH) ALL THE CATCH BASINS AND STORM DRAIN CLEANOUTS SHALL BE INSPECTED AND CLEANED OF ANY DEBRIS, SILT, TRASH AND SEDIMENT.

STORM DRAINAGE NOTES

1. CULVERTS SHALL BE POLYVINYL CHLORIDE (PVC SDR35), HIGH DENSITY POLYETHYLENE (HDPE ADS N12 OR EQUAL), OR REINFORCED CONCRETE PIPE (RCP), AND SHALL HAVE A SMOOTH INTERIOR CONFORMING TO SECTION E – STORM DRAINAGE FACILITIES OF COUNTY OF SANTA CRUZ DESIGN CRITERIA.

2. INLETS SHALL BE CHRISTY CONCRETE PRODUCTS OR APPROVED EQUAL WITH SMOOTH CONCRETE BOTTOM.

3. DISCHARGE ALL DOWNSPOUTS TO PERIMETER STORM DRAIN.

TOPOGRAPHIC SURVEY

THE TOPOGRAPHIC SURVEY AND BOUNDARY INFORMATION PROVIDED HEREON WAS COMPLETED BY HANAGAN LAND SURVEYING. RI ENGINEERING INC. MAKES NO GUARANTEE AS TO THE ACCURACY OF BOTH. THE CONTRACTOR SHALL VERIFY THE BOUNDARY LOCATION AND TOPOGRAPHIC INFORMATION PRIOR TO COMMENCING WORK.

BASIS OF BEARINGS

THE BASIS OF BEARING FOR THIS MAP HAS BEEN REESTABLISHED BETWEEN FOUND MONUMENTS ON THE NORTH LINE OF BEACH DRIVE PER RECORD MAP 024-M-26, SANTA CRUZ COUNTY RECORDS.

BASIS OF ELEVATION

COUNTY BENCHMARK NO. 476,
ELEVATION = 13.40', NAVD 88

THE CONTOUR INTERVAL IS 1 FOOT.

BASE MAP: "Grading & Drainage Plan - Site Improvements For Kirk & Mary Kozlowski - 266 Cliff Court - Aptos, CA 95006 - APN # 043-081-13", prepared by R.I. Engineering, dated August 2021, intended scale of publicaion is 1"=10'.

EARTHWORK AND GRADING

1. WORK SHALL CONSIST OF ALL CLEARING, GRUBBING, STRIPPING, PREPARATION OF LAND TO BE FILLED, EXCAVATION, SPREADING, COMPACTION AND CONTROL OF FILL, AND ALL SUBSIDIARY WORK NECESSARY TO COMPLETE THE GRADING TO CONFORM TO THE LINES, GRADES, AND SLOPES, AS SHOWN ON THE APPROVED PLANS.

2. ALL GRADING OPERATIONS SHALL CONFORM TO SECTION 19 OF THE CALTRANS STANDARD SPECIFICATIONS, AND SHALL ALSO BE DONE IN CONFORMANCE WITH THE REQUIREMENTS OF THE COUNTY OF SANTA CRUZ. THE MOST STRINGENT GUIDELINE SHALL PREVAIL.

3. REFERENCE IS MADE TO THE GEOTECHNICAL INVESTIGATIONS BY PACIFIC CREST ENGINEERING., ENTITLED "266 CLIFF COURT," DATED MAY 22, 2021. THE CONTRACTOR SHALL MAKE A THOROUGH REVIEW OF THIS REPORT AND SHALL FOLLOW ALL RECOMMENDATIONS THEREIN. THE CONTRACTOR SHALL CONTACT PACIFIC CREST ENGINEERING. FOR ANY CLARIFICATIONS NECESSARY PRIOR TO PROCEEDING WITH THE WORK.

4. THE CONTRACTOR SHALL GRADE TO THE LINE AND ELEVATIONS SHOWN ON THE PLAN AND SHALL SECURE THE SERVICES OF A LICENSED LAND SURVEYOR OR REGISTERED CIVIL ENGINEER TO PROVIDE STAKES FOR LINE AND GRADE.

5. THE GEOTECHNICAL ENGINEER SHOULD BE NOTIFIED AT LEAST FOUR (4) DAYS PRIOR TO ANY SITE CLEARING AND GRADING OPERATIONS.

6. STRIPPED AREAS SHOULD BE SCARIFIED TO A DEPTH OF ABOUT 6", WATER-CONDITIONED TO BRING THE SOILS WATER CONTENT TO ABOUT 2% ABOVE THE OPTIMUM, AND COMPACTED TO A DENSITY EQUIVALENT TO AT LEAST 90% OF THE MAXIMUM DRY DENSITY OF THE SOIL ACCORDING TO ASTM D1557 (LATEST EDITION). SUBGRADES AND AGGREGATE BASE ROCK FOR PAVEMENTS SHOULD BE COMPACTED TO A MINIMUM OF 95%

7. ENGINEERED FILL SHOULD BE PLACED IN THIN LIFTS NOT EXCEEDING 8" IN LOOSE THICKNESS, MOISTURE CONDITIONED, AND COMPACTED TO AT LEAST 90% RELATIVE COMPACTION.

8. MATERIAL USED FOR ENGINEERED FILL SHALL MEET THE REQUIREMENTS OF THE AFOREMENTIONED REPORTS BY PACIFIC CREST ENGINEERING.

9. IMPORTED FILL MATERIAL USED AS ENGINEERED FILL FOR THE PROJECT SHALL MEET THE REQUIREMENTS OF THE AFOREMENTIONED GEOTECHNICAL INVESTIGATION.

10. ALL FILL MATERIAL SHALL BE APPROVED BY THE PROJECT GEOTECHNICAL ENGINEER PRIOR TO JOBSITE DELIVERY AND PLACEMENT. NO EARTHWORK OPERATIONS SHALL BE PERFORMED WITHOUT THE DIRECT OBSERVATION AND APPROVAL OF THE GEOTECHNICAL ENGINEER.

11. BARE GROUND WITHIN 10' OF FOUNDATIONS SHALL BE SLOPED AWAY @ 5% MINIMUM OR 2% MINIMUM FOR PAVED SURFACES.

PLANNING SUBMITTAL

Exhibit H
Attachment 1

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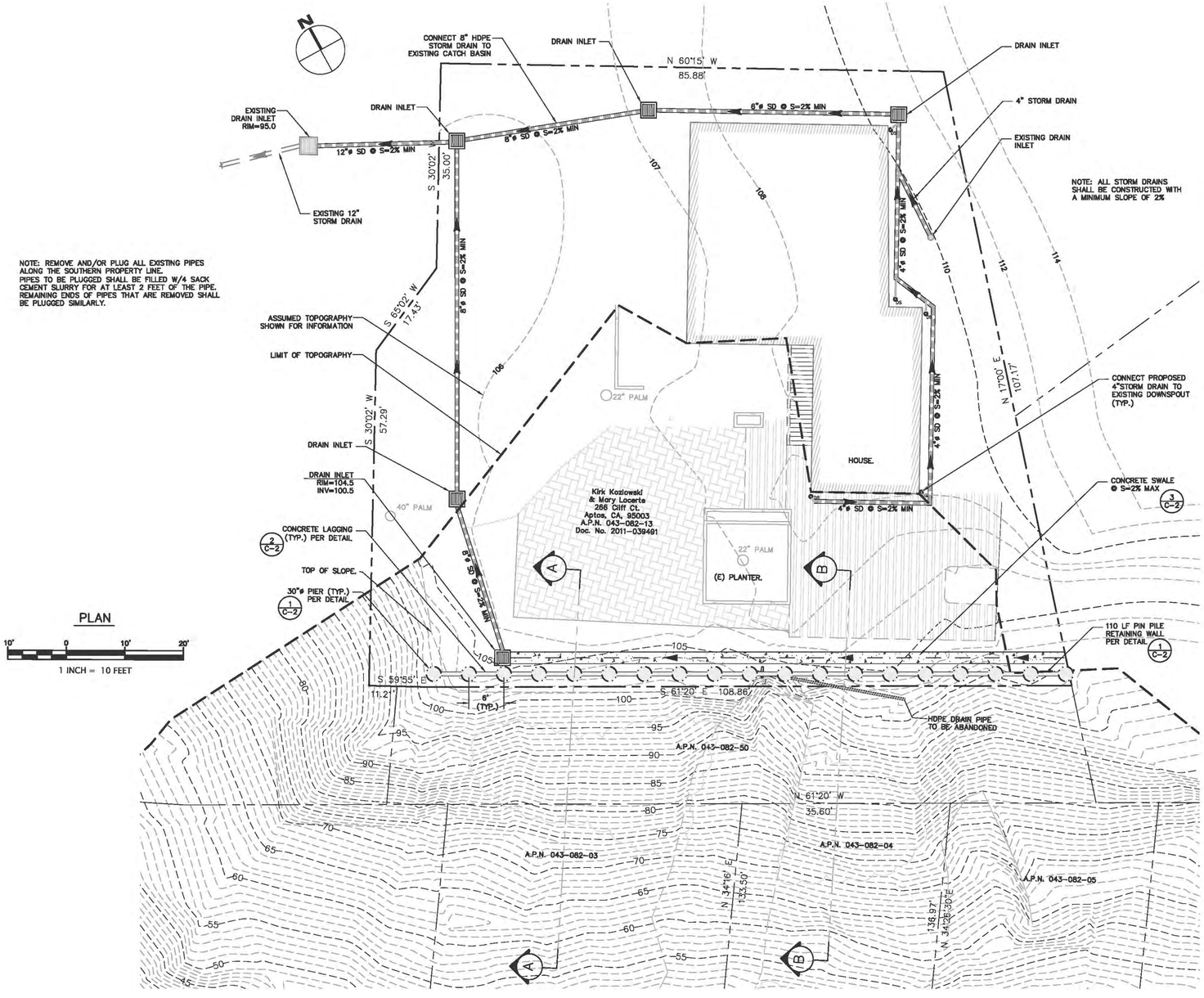
APPENDIX B – R.I. ENGINEERING GRADING & DRAINAGE PLANS

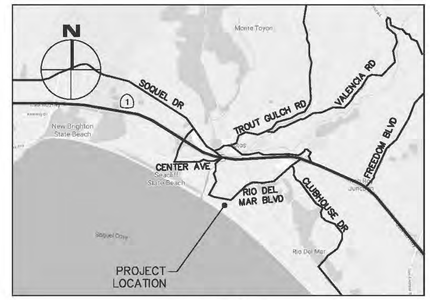


NOTE: REMOVE AND/OR PLUG ALL EXISTING PIPES ALONG THE SOUTHERN PROPERTY LINE. PIPES TO BE PLUGGED SHALL BE FILLED W/4 SACK CEMENT SLURRY FOR AT LEAST 2 FEET OF THE PIPE. REMAINING ENDS OF PIPES THAT ARE REMOVED SHALL BE PLUGGED SIMILARLY.

PLAN

10' 0 10' 20'

1 INCH = 10 FEET



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NTS

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PLANNING SUBMITTAL

REGISTERED PROFESSIONAL ENGINEER RICHARD J. KROM No. 45830 Exp. 12-31-22 CIVIL STATE OF CALIFORNIA

8/30/2021

R.J Engineering, Inc.
303 Potrero St., Suite 42-202, Santa Cruz, CA 95060
831-425-3901 www.rjengineering.com

SITE IMPROVEMENTS FOR KIRK & MARY KOZLOWSKI 266 CLIFF COURT APTOS, CA 95003 APN # 043-081-13

GRADING & DRAINAGE PLAN

project no. 20-074-1
date AUGUST 2021
scale AS SHOWN
dwg name CIVIL1.dwg

C-1

Exhibit H
Attachment 1

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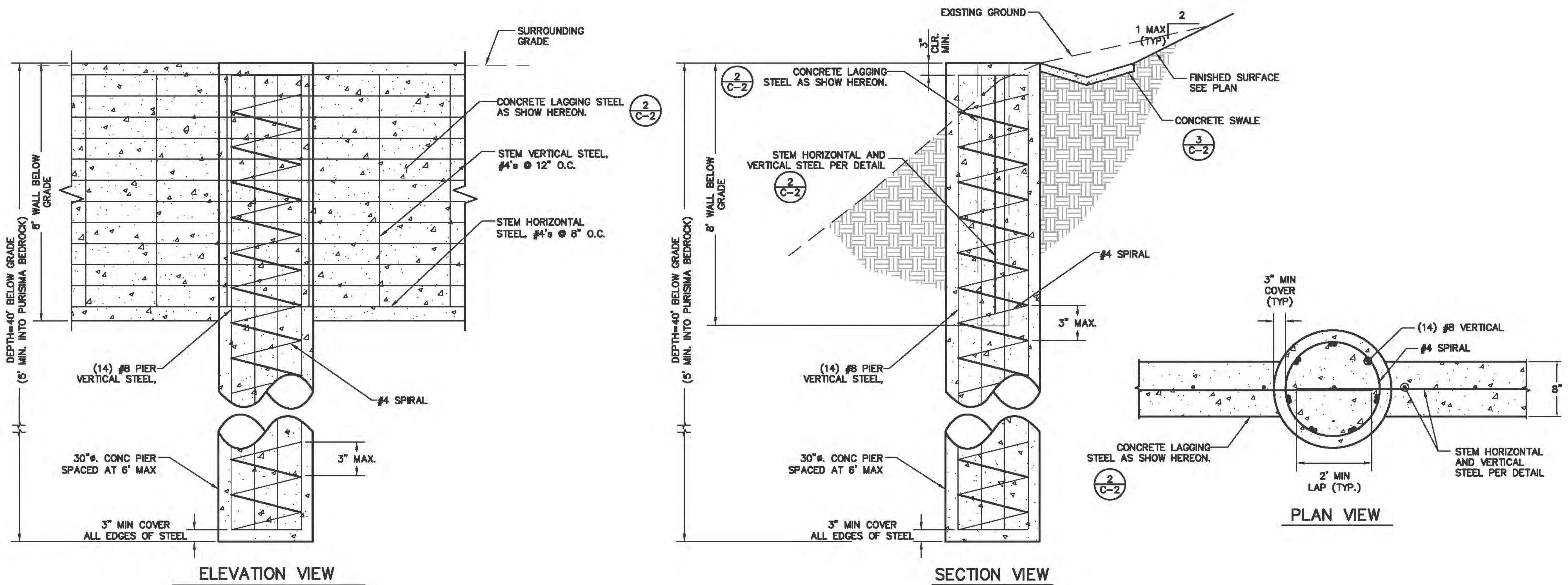
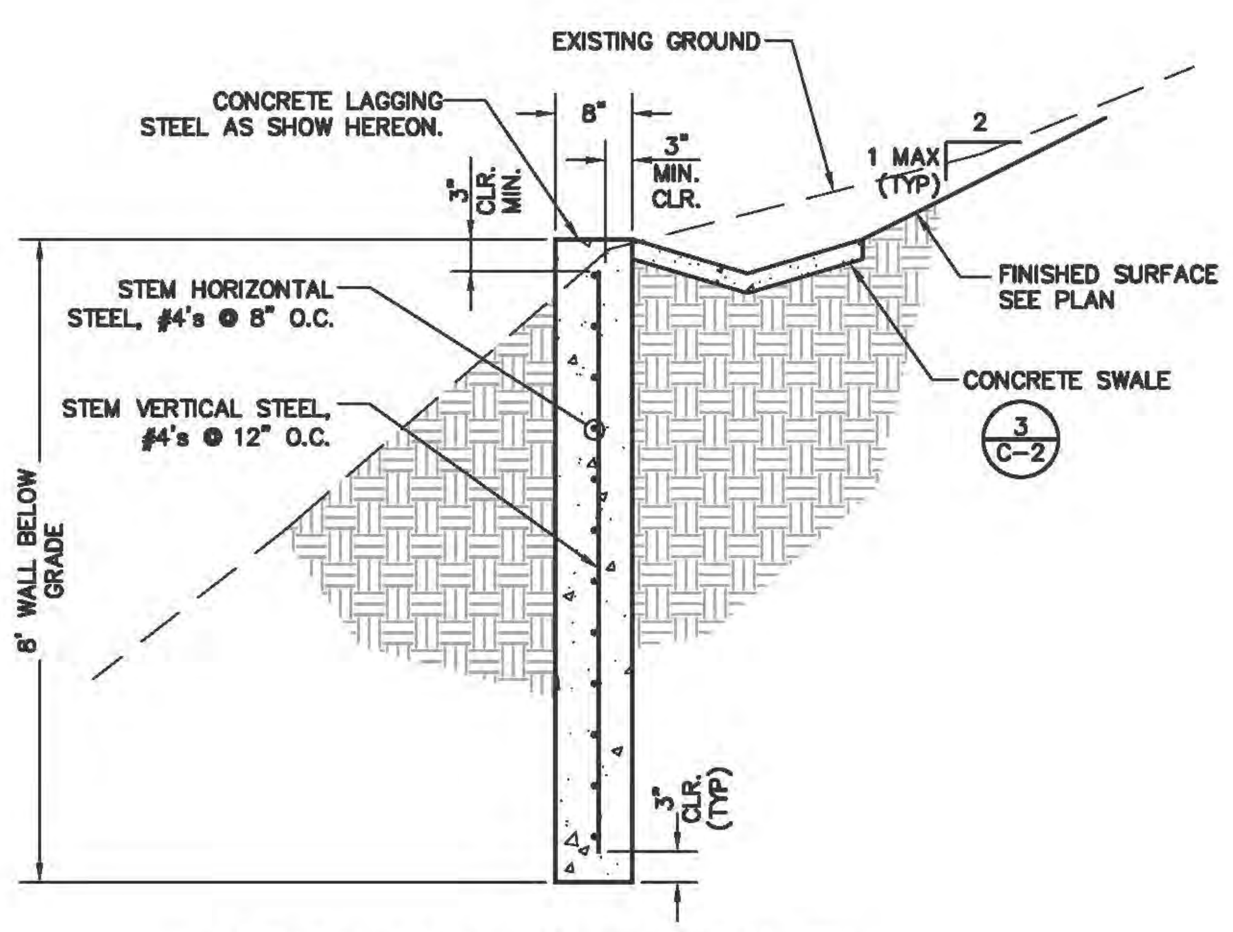
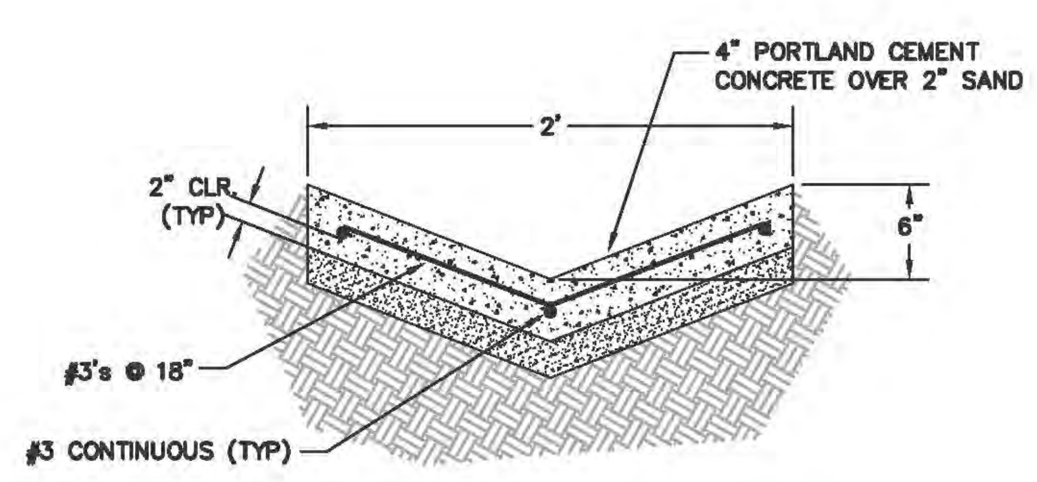


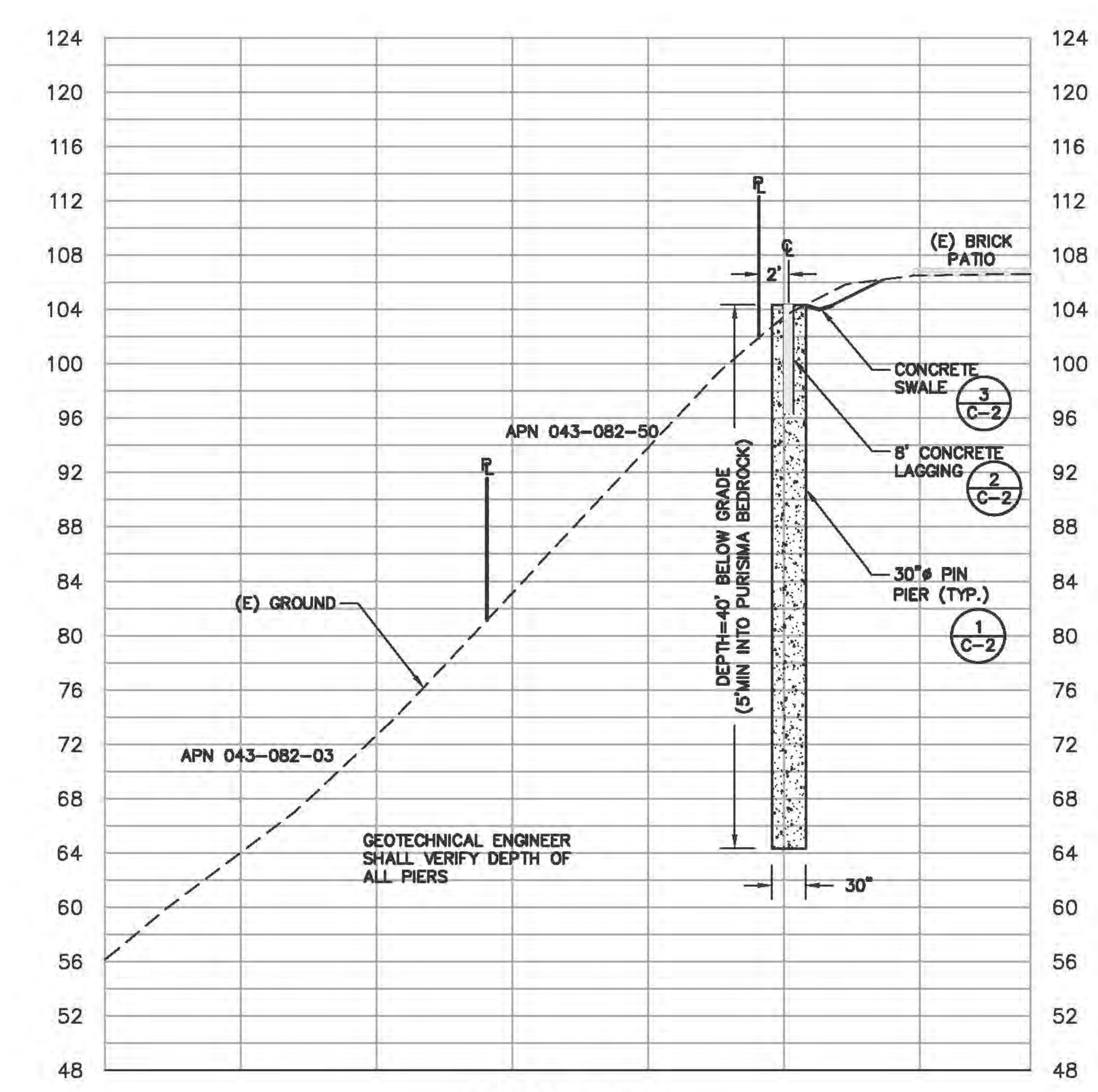
PIN PIER WALL & CONCRETE LAGGING (1 C-2)
NTS



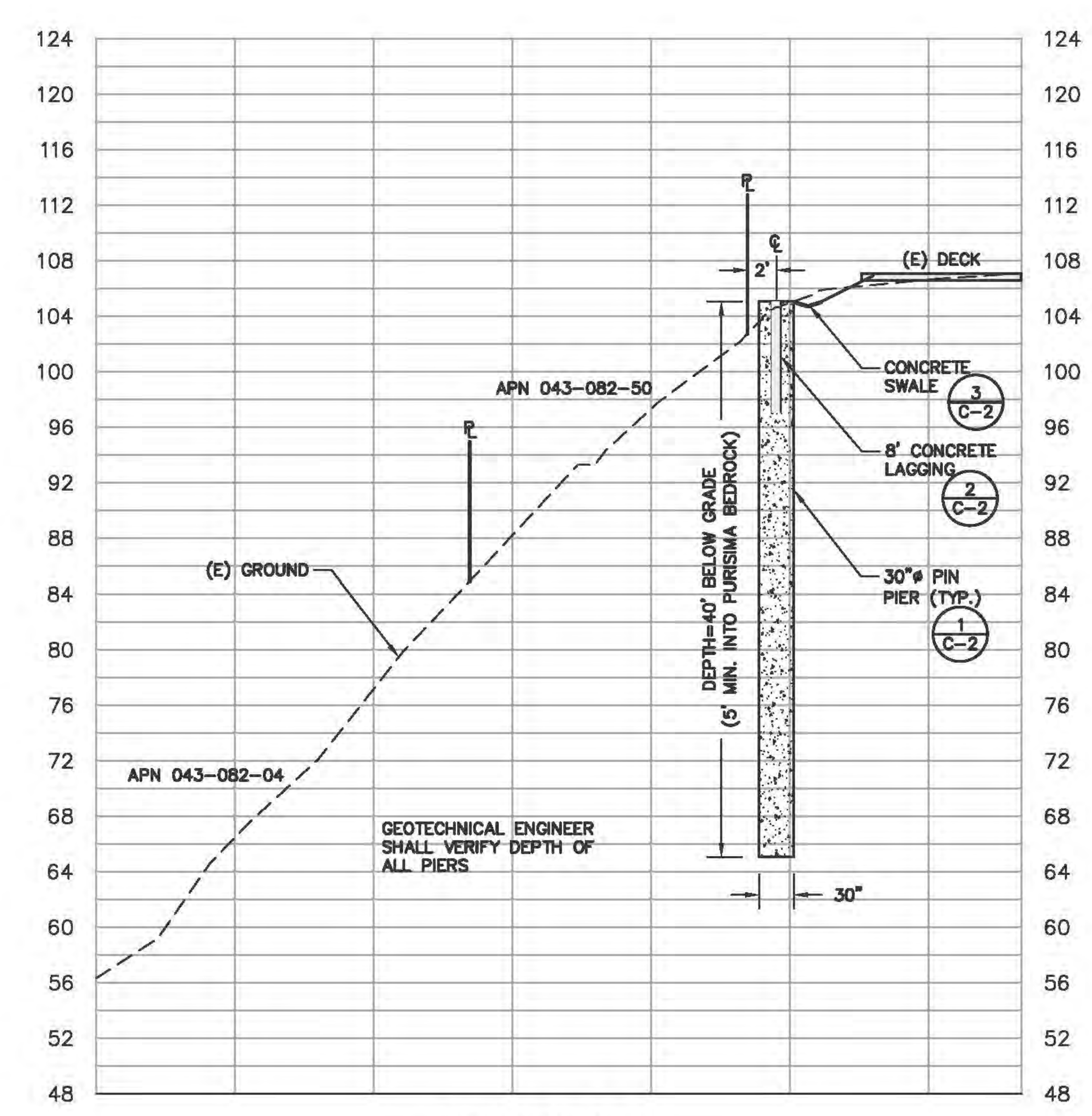
CONCRETE LAGGING SECTION (2 C-2)
NTS



CONCRETE SWALE DETAIL (3 C-2)
NTS



SECTION A–A
SCALE: 1"=10' HORIZONTAL, VERTICAL



SECTION B–B
SCALE: 1"=10' HORIZONTAL, VERTICAL

SPECIFICATIONS

1. CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH CBC SECTION 1905 AND ACI 301.

2. CONCRETE SHALL BE TYPE V AND HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 4,500 PSI. CONCRETE SHALL HAVE A MAXIMUM WATER TO CEMENT RATIO OF 0.50.

3. STEEL REINFORCING SHALL CONFORM TO ASTM DESIGNATION A614, GRADE 60.

4. PLACEMENT AND HANDLING OF STEEL REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF SECTION 52, "REINFORCEMENT OF THE CALTRANS STANDARD SPECIFICATIONS.

5. ANCHOR BOLTS SHALL CONFORM TO ASTM DESIGNATION A 307 OR ASTM DESIGNATION A36. ANCHOR BOLTS, NUTS AND WASHERS SHALL BE GALVANIZED IN CONFORMANCE WITH SECTION 75–1.05 "GALVANIZING" OF THE CALTRANS STANDARD SPECIFICATIONS.

6. TIMBER CONNECTORS, SHEAR WALL HOLD DOWNS AND OTHER METAL FASTENINGS SHALL BE SIMPSON STRONG TIE COMPANY CONNECTORS OR APPROVED EQUAL. FASTERERS SHALL BE HOT DIP GALVANIZED.

8. EXPOSED POSTS SHALL BE PRESSURE TREATED DOUG FIR LARCH NO.1 OR APPROVED EQUAL.

9. STRUCTURAL LUMBER SHALL BE DOUGLAS FIR–LARCH OR EQUAL. LUMBER AND TIMBER SHALL BE OF THE STRESS GRADE SHOWN ON THE PLANS IF NO DESIGNATION IS SHOWN ON THE PLANS ALL COLUMNS, BEAMS, GIRDERS, JOISTS AND PURLINS SHALL BE #2 GRADE OR BETTER. STRUCTURAL TIMBERS SHALL BE GRADED IN ACCORDANCE WITH THE CURRENT STANDARD GRADING PRACTICES ADOPTED BY THE WESTERN WOOD PRODUCTS ASSOCIATION. ALL SIZES SHOWN ON THE PLANS SHALL REFER TO NOMINAL SIZES, UNLESS OTHERWISE NOTED.

10. PRESERVATIVE TREATMENT OF LUMBER SHALL CONFORM TO THE REQUIREMENTS OF SECTION 58 OF THE CALTRANS STANDARD SPECIFICATIONS. CUT ENDS AND EXPOSED PORTIONS OF PRESSURE TREATED LUMBER SHALL BE IMMERSED A MINIMUM OF 6" INTO PRESERVATIVE SOLUTION. GUARDRAIL POSTS AND BLOCKS SHALL MET THE REQUIREMENTS OF CALTRANS CURRENT SPECIFICATIONS AND THESE PLANS. WHICHEVER STANDARD IS MORE STRINGENT SHALL APPLY.

12. NOTE DOCUMENTATION SHALL BE PROVIDED THAT VERIFIES I–BEAM SOLDER PILES COMPLY WITH THE REQUIREMENTS OF THE AISC 360 AS SPECIFIED IN CBC, SECTION 2205.1

13. STRUCTURAL STEEL SHALL CONFORM TO ASTM DESIGNATION A36 AND SHALL HAVE A MINIMUM ALLOWABLE BENDING STRESS OF 36,000 PSI. BOLTED AND WELDED CONNECTIONS SHALL CONFORM TO THE REQUIREMENTS OF THE 2016 CALIFORNIA BUILDING CODE AND THESE SPECIFICATIONS.

14. WELDED CONNECTIONS SHALL MEET THE REQUIREMENTS OF FEMA 350 AND THE 2001 CALIFORNIA BUILDING CODE CHAPTER 22, "STEEL."

15. ALL NAILS AND ANCHOR BOLTS THAT WILL BE IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE HOT–DIPPED GALVANIZED PER ASTM A153. FASTENERS AND CONNECTORS EXPOSED TO WET WEATHER SHALL BE STAINLESS STEEL, TYPE A304

6/30/2021

RI Engineering, Inc.
303 Potrero St., Suite 42-202, Santa Cruz, CA 95060
831-425-3901 www.riengineering.com

SITE IMPROVEMENTS
FOR
KIRK & MARY KOZLOWSKI
256 CLIFF COURT
APTOS, CA 95003
APN # 043-081-13

DETAILS

project no.
20-074-1
date
AUGUST 2021
scale
AS SHOWN
dwg name
CIVIL1.dwg

C-2

Exhibit H
Attachment 1
PLANNING SUBMITTAL

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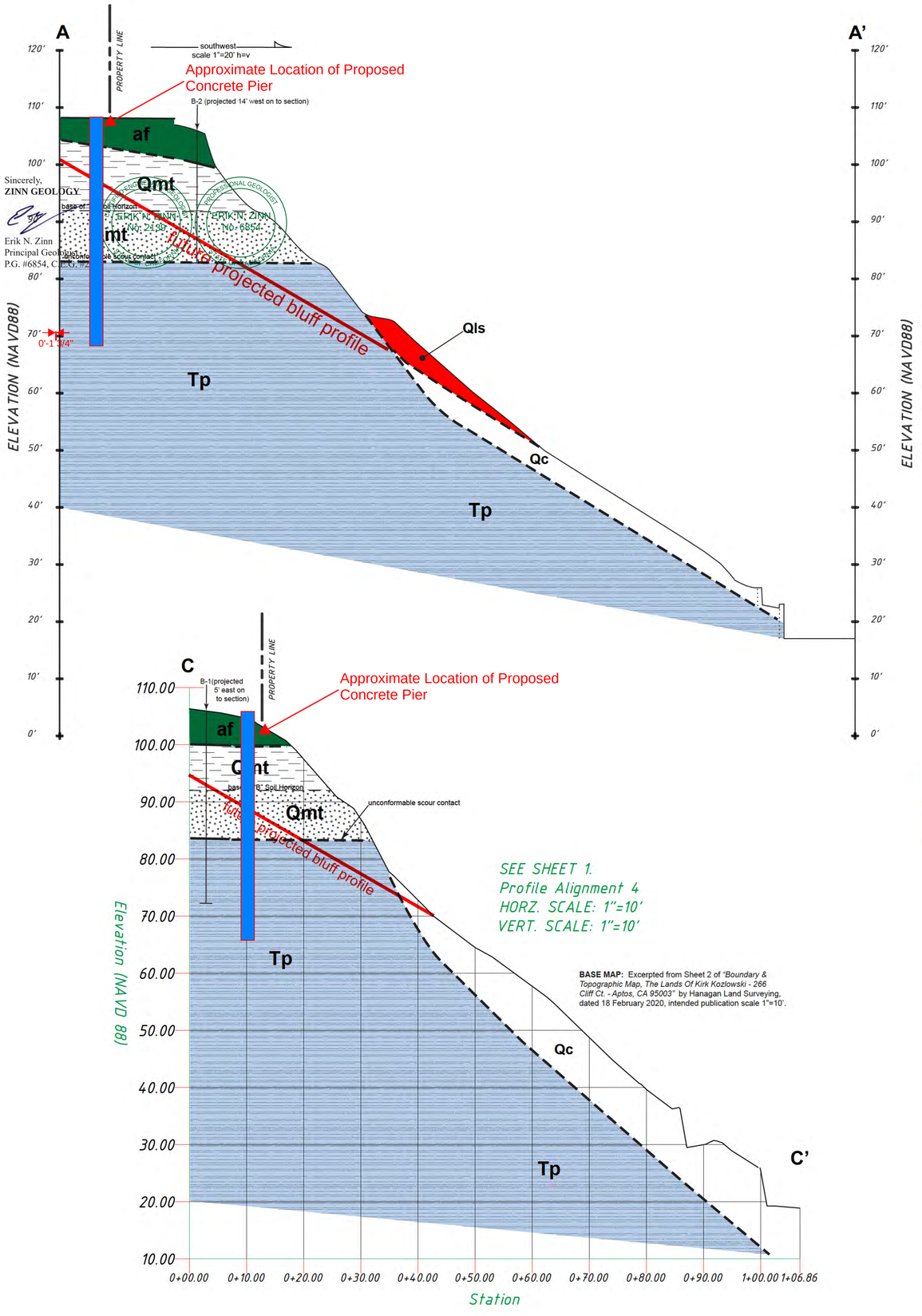
Exhibit H
Attachment 2

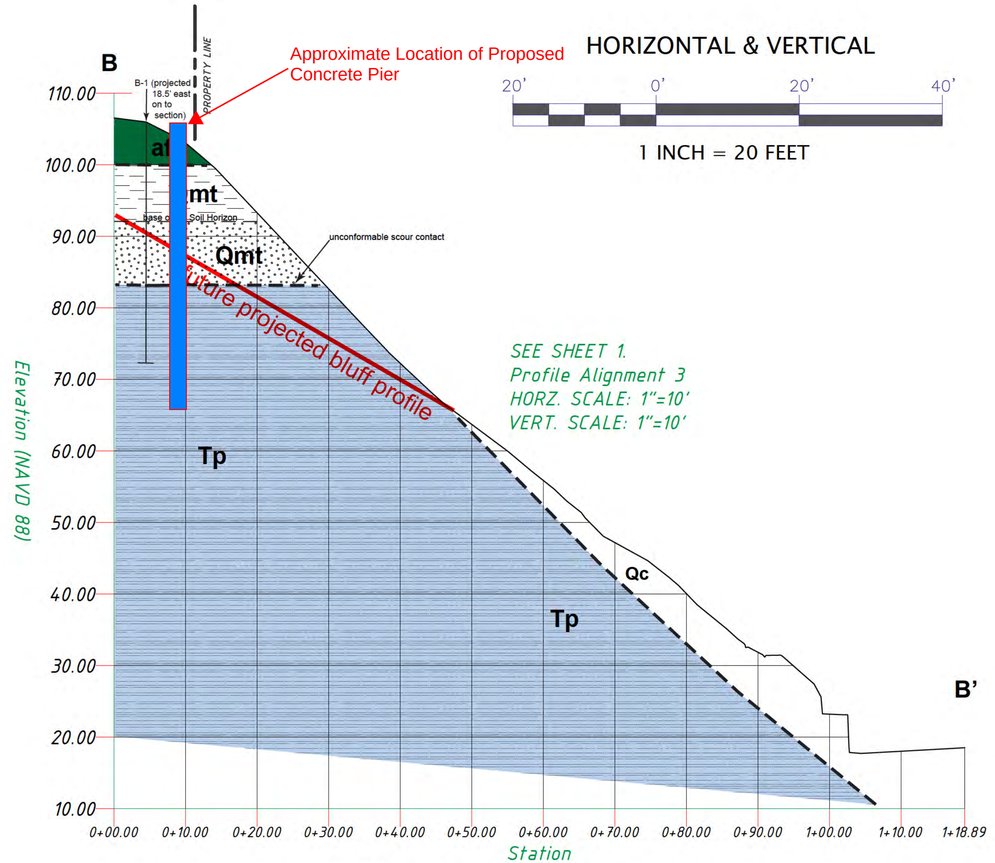


Sincerely,
ZINN GEOLOGY

Erik N. Zinn
Principal Geologist
P.G. #6854, C.E.G. #2

SEE SHEET 1.
Profile Alignment 4
HORZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

BASE MAP: Excerpted from Sheet 2 of *"Boundary & Topographic Map, The Lands Of Kirk Kozlowski - 266 Cliff Ct. - Aptos, CA 95003"* by Hanagan Land Surveying, dated 18 February 2020, intended publication scale 1"=10'.



HORIZONTAL & VERTICAL
20' 0' 20' 40'
1 INCH = 20 FEET

SEE SHEET 1.
Profile Alignment 3
HORZ. SCALE: 1"=10'
VERT. SCALE: 1"=10'

BASE MAP: Excerpted from Sheet 2 of *"Boundary & Topographic Map, The Lands Of Kirk Kozlowski - 266 Cliff Ct. - Aptos, CA 95003"* by Hanagan Land Surveying, dated 18 February 2020, intended publication scale 1"=10'.

Basis of Elevation

County Benchmark No. 476,
Elevation = 13.40', NAVD 88.

The contour interval is 1 foot.

EXPLANATION

EARTH MATERIALS

Qls	Landslide deposit
Qc	Colluvium
af	Artificial fill
Qmt	Marine terrace deposit
Tp	Purisima Formation

SYMBOLS

Earth materials contact - dashed where approximate, queried where uncertain

B-2

Location of small-diameter exploratory test borings advanced by Pacific Crest Engineering - see their report for logs of borings

CERTIFIED ENGINEERING GEOLOGIST · ERIK N. ZINN No. 2139 · STATE OF CALIFORNIA

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ZINN GEOLOGY
2351 46th Avenue
Santa Cruz, CA 95062
Tel. 831.334.4833
enzinn@gmail.com

Geological Cross Sections
Lands of Kozlowski
266 Cliff Court
Aptos, California 95003

Date: 3 March 2021	Revised: 1 September 2021
Job #2020001-G-SC	
Scale: 1"=10', h=v	**Plate 2**
Drawn by: ENZ	

Exhibit H
Attachment 3