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UPDATE GEOLOGIC INVESTIGATION

Krimson Coast Holdings, LLC

36240 Highway 1

Big Sur, California

Monterey County APN 243-251-011-000

Latitude: 36.4101°

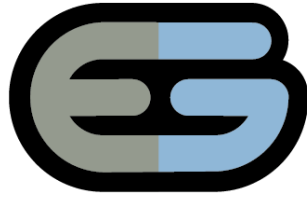
Longitude -121.9151°

This report details the findings from our geologic investigation of the above-referenced property.

Easton Geology Job No. C21014

2 October 2023





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2 October 2023

Rupa Desai
Krimson Coast Holdings, LLC
1509 Laurelwood Crossing Terrace
San Jose, CA 95138

Job No. C21014

Re: Update Geologic Investigation of Coastal Property
36240 Highway 1, Big Sur, California
Monterey County APN 243-251-011-000

Dear Ms. Desai:

We are pleased to present the findings from our geologic investigation of the above-referenced parcel, where an existing residence is slated to be razed and a new single-family residence with a basement constructed in the same general location. An accessory dwelling unit is also proposed in the northern portion of the parcel, below the residence. The western portion of the parcel is bordered by a steep bluff above the Pacific Ocean.

The purpose of our work was to investigate the potential geologic hazards which may pose a risk to the proposed development on the property and provide recommendations to help mitigate the identified hazards. We worked closely with the geotechnical engineering firm of Rock Solid Engineering during our investigation. The results of our work indicate that redevelopment of the parcel is geologically feasible provided the recommendations contained in this report, and those of the project geotechnical engineer are closely followed.

Please contact us if you have any questions regarding this report.

Sincerely,

EASTON GEOLOGY, INC.

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



Copies: Addressee (1 and pdf)
Eric Miller Architects, attn: Carla Hashimoto (2 and pdf)
Rock Solid Engineering, attn: Yvette Wilson (pdf)

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INTRODUCTION

This update report presents the findings from our investigation of the geologic and geomorphic conditions at the subject property, located at 36240 Highway 1 in Big Sur, California (Figure 1). The parcel is situated between Highway 1 and the Pacific Ocean, just south of Kasler Point, and is comprised of a high granitic knoll and a lower terrace surface. We understand you propose to raze an existing residence on the parcel on the knoll and construct a new single-family residence with a basement in approximately the same location, and construct an ADU on the terrace surface to the northwest. A very steep coastal bluff bounds the western portion of the parcel and a conspicuous erosional feature on the bluff-face lies seaward of the existing residence. The primary geologic concerns for the site are slope instability, long-term coastal erosion, and seismic shaking.

For this update we have addressed the relocation of the proposed residence subsequent to our initial report, extended the 100-year setback along the bluff and analyzed newly proposed blufftop improvements, and we respond to a comment from the Monterey County Planning Department pertaining to the position of the formerly proposed residence with respect to long-term bluff stability. This update report supersedes our earlier report.

A review comment from Monterey County Housing and Community Development (2023) for an initial development project application requested that the project geologist *recommend any alterations to the design that would improve the long-term stability and safety of the proposed development*. Portions of the proposed residence at that time encroached seaward of our stipulated 100-year setback. We worked closely with the project team to evaluate options for improving the long-term stability of the development, and it was decided to relocate the residence such that it is situated landward of the 100-year setback.

The scope of work performed for this investigation included: 1) review of published and unpublished maps and literature relevant to the site and vicinity; 2) analysis of lidar imagery and vertical stereoscopic and oblique aerial photographs covering the subject area; 3) geologic mapping and reconnaissance of the site; 4) co-logging of exploratory borings advanced at the site; 5) compilation and analysis of collected data; 6) coordination with project professionals; and 7) preparation of this report and accompanying illustrations, including a geologic map and cross sections.

REGIONAL GEOLOGIC SETTING

The subject site is situated atop a tall, very steep granitic coastal bluff at the base of the Santa Lucia Mountains between Carmel Highlands and Big Sur. The bluff has formed due to local faulting and shoreline erosion of the late Mesozoic Salinian basement underlying the area.

Relatively rapid tectonic uplift and local faulting have given rise to the Santa Lucia Mountains which dominate the region. The Santa Lucia Mountains are characterized by a steep range front rising abruptly from the Pacific Ocean, displaying a series of rugged, linear ridges and valleys aligned with the pronounced northwest to southeast structural grain of central California geology. The Santa Lucia Mountains are underlain by what has been termed by some geologists as the Monterey terrane; a large, elongate, allochthonous segment of continental crust underlying the California Coast Ranges. Others characterize the area as underlain by the Salinian block, a

basement rock composed of metamorphic and granitic rocks, separated from subjacent accretionary wedge rocks by local faults. In the Big Sur region, the Monterey terrane has been grouped to incorporate three contrasting tectonic units; the Salinian block, the Sierra de Salinas block, and the Nacimiento block (Ducea et al., 2009). The Nacimiento basement rock consists of Franciscan Complex and Coast Range Ophiolite and is bounded to the northeast by the Sur fault. The Salinian basement consists of igneous and metamorphic rocks bounded by the Sur fault to the southwest and the Salinas shear zone to the northeast. Northeast of the Salinas shear zone, the Sierra de Salinas basement consists of metamorphosed sedimentary rocks. The Monterey terrane as a whole has been displaced northwestward by the San Andreas fault since the Cenozoic (about 65 million years ago). The basement rocks are locally overlain by Cretaceous and Late Mesozoic sedimentary rocks (Figure 2; Regional Geologic Map).

Throughout the Cenozoic and Late Cenozoic Era, this portion of California has been dominated by tectonic forces associated with lateral or "transform" motion between the North American and Pacific crustal plates, producing long, northwest-trending faults such as the San Andreas and San Gregorio faults, with horizontal displacements measured in tens to hundreds of miles. Compressive stresses have also resulted in reverse and oblique thrust movements along local faults.

The seismicity of the area is influenced primarily by the northwest-trending San Gregorio fault located west of the subject property. The seismicity of the site will be discussed in more detail below.

REGIONAL SEISMIC SETTING

California's broad system of strike-slip faulting has a long and complex history. Several local and regional faults present seismic hazards to the subject property. The most important of these are the San Andreas, San Gregorio, and Monterey Bay-Tularcitos fault zones (Figure 2). These faults are either active or considered potentially active (Buchanan-Banks et al., 1978; Burkland and Associates, 1975; Greene, 1977; Hall et al., 1974; Jennings et al., 1975; Schwartz et al., 1990; Wallace, 1990; Working Group on Northern California Earthquake Potential [WGNCEP], 1996; and Working Group on California Earthquake Probabilities, 2008. Each fault is discussed below. The intensity of seismic shaking that could occur at the site in the event of a future earthquake on one of these faults will be discussed in a later section.

San Andreas Fault

The San Andreas fault is active and represents the major seismic hazard in northern California (Jennings et al., 1975; Hall et al., 1974; Bryant and Lundberg, 2002a; Bryant and Lundberg, 2002b). The main trace of the San Andreas fault trends northwest-southeast and extends over 700 miles from the Gulf of California through the Coast Ranges to Point Arena, where the fault extends offshore.

Geologic evidence suggests that the San Andreas fault has experienced right-lateral, strike-slip movement throughout the latter portion of Cenozoic time, with a cumulative offset of hundreds of miles. Surface rupture during historical earthquakes, fault creep, and historical seismicity confirm that the San Andreas fault and its branches, the Hayward, Calaveras, and San Gregorio faults, are all active today.

Historical earthquakes along the San Andreas fault and its branches have caused significant seismic shaking in the Santa Cruz County area. The two largest historical earthquakes on the San Andreas to affect the area were the moment magnitude (M_w) 7.9 San Francisco earthquake of April 18, 1906 (actually centered near Olema) and the M_w 6.9 Loma Prieta earthquake of October 17, 1989. The San Francisco earthquake caused severe seismic shaking and structural damage to many buildings in Santa Cruz County. The Loma Prieta earthquake appears to have caused more intense seismic shaking than the 1906 event in localized areas of the Santa Cruz Mountains, even though its regional effects were not as extensive. There were also significant earthquakes in northern California along or near the San Andreas fault in 1838, 1865, and possibly 1890 (Sykes and Nishenko, 1984; WGNCEP, 1996).

Geologists have recognized that the San Andreas fault system can be divided into segments with earthquakes of different magnitudes and recurrence intervals (Working Group on California Earthquake Probabilities, 1988 and 1990). A study by the WGNCEP in 1996 redefined the segments and the characteristic earthquakes for the San Andreas fault system in northern and central California. Two overlapping segments of the San Andreas fault system represent the greatest potential hazard to the subject property. The first segment is defined by the rupture that occurred from Cape Mendocino to San Juan Bautista along the San Andreas fault during the great 1906 M_w 7.9 earthquake. The WGNCEP (1996) has hypothesized that this "1906 rupture" segment experiences earthquakes with comparable magnitudes in independent cycles about two centuries long.

The second segment is defined by the rupture zone of the M_w 6.9 Loma Prieta earthquake, despite the fact that the oblique slip and depth of this event does not fit the ideal of a typical, right-lateral strike-slip event on the San Andreas fault. Although it is uncertain whether this "Santa Cruz Mountains" segment has a characteristic earthquake independent of great San Andreas fault earthquakes, the WGNCEP (1996) assumed an "idealized" earthquake of M_w 7.0 with the same right-lateral slip as the 1989 Loma Prieta earthquake and a multi-segment recurrence interval of 400 years, and the WGCEP (2008) has determined that the San Andreas – Santa Cruz Mountains Section has a recurrence interval of about 190 years. Field et al. (2014) determined that the Santa Cruz Mountains Section of the San Andreas fault has about a 16% probability of generating an M_w 6.7 or greater earthquake in the next 30 years.

Aagaard, et al., (2016) determined that a given segment of the San Andreas fault within the San Francisco Bay region has a 22% probability of generating an M_w 6.7 or greater earthquake in the next 30 years.

San Gregorio-Hosgri Fault Zone

The San Gregorio fault, as mapped by Greene (1977), Weber et al. (1979), Weber and Lajoie (1974), and Weber et al. (1995), skirts the coastline of Santa Cruz County northward from Monterey Bay and trends onshore at Point Año Nuevo. Northward from Año Nuevo, it passes offshore again, touching onshore briefly at Seal Cove just north of Half Moon Bay, and eventually connects with the San Andreas fault near Bolinas. Southward from Monterey Bay, the fault may trend onshore north of Big Sur (Greene, 1977) to connect with the Palo Colorado fault, but more likely it continues offshore and southward through Point Sur to connect with the Hosgri

fault in south-central California. Based on these two proposed correlations, the San Gregorio fault zone has a length of at least 100 miles and possibly as much as 250 miles.

The on-land exposures of the San Gregorio fault at Point Año Nuevo and Seal Cove show evidence of late Pleistocene displacement (Jennings, 1975; Buchanan-Banks et al., 1978) and Holocene displacement (Weber and Cotton, 1981; Simpson et al., 1997). In the Big Sur region, onshore strands of the San Gregorio fault are characterized by linear and deflected drainages and an alignment of saddles, benches, and scarps within marine terraces. Although stratigraphic offsets indicate a history of horizontal and vertical displacements, the San Gregorio is considered predominantly right-lateral strike slip by most researchers (Greene, 1977; Weber and Lajoie, 1974; and Graham and Dickinson, 1978).

In addition to stratigraphic evidence for Holocene activity, historical seismicity in the region is partially attributed to the San Gregorio fault (Greene, 1977). Due to inaccuracies of epicenter locations, the magnitude the 6+ earthquakes of 1926 (tentatively assigned to the Monterey Bay fault zone), may have actually occurred on the San Gregorio fault (Greene, 1977).

The WGNCEP (1996) divided the San Gregorio fault into the "San Gregorio" and "San Gregorio, Sur Region" segments. The segmentation boundary is located west of Monterey Bay, where the fault appears to have a right step-over (Figure 2). The San Gregorio segment is assigned a slip rate that results in a M_w 7.3 earthquake with a recurrence interval of 400 years. This value was assigned based on the preliminary results of a paleoseismic investigation at Seal Cove by Lettis and Associates (see Simpson et al., 1997) and on regional mapping by Weber et al. (1995). Simpson et al. (1997) discovered prior displacements consistent with a moment magnitude of 7 to $7\frac{1}{4}$ in their paleoseismic study at Seal Cove. The Sur Region segment is assigned a slip rate that results in a M_w 7.0 earthquake with an effective recurrence interval of 411 years. Within the Sur Region many geologists, including Greene (1977), map the San Gregorio fault zone as continuing along the Palo Colorado fault. Graham and Dickinson (1978) and Hall (1991) show the San Gregorio fault continuing along the Sur fault zone. Field et al. (2014) has determined that the probability of the San Gregorio fault generating a $M6.7$ or greater earthquake in the next 30 years is about 4%.

Monterey Bay-Tularcitos Fault Zone

The Monterey Bay fault zone is a 6 to 9 mile wide, 25 mile long zone of short, northwest-striking en echelon faults trending between the San Gregorio fault zone in the northwest portion of Monterey Bay and the Seaside-Monterey area in the southern end of the bay (Bryant, 2001). The Monterey Bay fault zone is part of the larger Monterey Bay-Tularcitos fault zone which extends 50 miles southeast from the San Gregorio fault to near the crest of the Sierra de Salinas range. Other faults within the greater Monterey Bay fault zone include, from southwest to northeast, the Tularcitos-Navy, Berwick Canyon, Chupines, Seaside, and Ord Terrace faults. These faults exhibit evidence of possible late Quaternary and Holocene age right-lateral slip. Several of these onshore fault traces which intersect the coast in the vicinity of Seaside and Fort Ord have been tentatively correlated with offshore traces in the middle of Monterey Bay (Greene, 1977; Clark et al., 1973; Burkland and Associates, 1975). Geomorphic expression of the Monterey Bay fault zone is revealed by fault strands offsetting the seafloor of southern Monterey Bay.

Seismically, the Monterey Bay-Tularcitos fault zone may be historically active. The largest historical earthquakes *tentatively* located in the Monterey Bay-Tularcitos fault zone are two events, estimated at 6.2 on the Richter Scale, in October 1926 (Greene, 1977). Because of possible inaccuracies in locating the epicenters of these earthquakes, it is possible that they actually occurred on the nearby San Gregorio fault zone (Greene, 1977).

Petersen et al. (1996) calculated an M_w 7.1 earthquake for the Monterey Bay-Tularcitos fault zone with a recurrence interval of 2,841 years and a slip rate of about 0.5 millimeters per year. Field et al. (2014) determined that the Monterey Bay-Tularcitos fault zone has about a 1% probability of generating an M_w 6.7 or greater earthquake in the next 30 years.

DESCRIPTION OF SITE AND VICINITY

The Site Location Map (Figure 1), Local Geologic Map (Figure 3), Site Geologic Map (Plate 1), Geologic Cross Sections (Plate 2), and Logs of Exploratory Borings (Appendix B) depict the relevant topographic and geologic information on the subject property.

Geomorphology

The subject property encompasses a high, elongate granitic knoll (a fossil seastack) and lowland area comprised of remnant debris fan deposits (a marine terrace) which overlie an eroded granitic surface. Grading for the existing residence, constructed circa 1964, created a cut and fill pad at the north end of the granite knoll. The proposed ADU site in the north portion of the property is situated upon fan deposits and is currently sited with a horse corral. The residence site is situated about 130 feet above sea level, and the proposed ADU site lies approximately 100 feet above sea level. A gentle slope of approximately 25 percent grade descends from the residence site to the ADU site.

The fossil seastack and fan deposits are many tens of thousands of years old and formed during the last interglacial and at the onset of the most recent glacial period. Ongoing coastal erosion since the last glacial maximum has led to the formation of the very steep bluff to the west. Coastal erosion and its associated geomorphic features at the site are the result of the combined processes of sea level fluctuation, tectonic uplift, and erosion over tens to hundreds of thousands of years.

The typical process of coastal bluff formation is as follows: During rising sea levels, waves erode a relatively planar surface into the bedrock of a headland or preexisting bluff. This surface is termed a shore platform and is backed by the freshly eroded coastal bluff. As sea level lowers (as it did during the last ice age), sediment from inland streams and adjacent slopes is deposited upon the retreating shoreline and across the newly emergent coastal plain. During this time, steady tectonic uplift elevates the coastal plain and region, forming a terrace. With a subsequent rise in sea level (as it has been for about the last 18,000 years) a new bedrock shore platform and bluff is eroded into the seaward edge of the uplifted terrace. The rate of bluff retreat is primarily controlled by the rate of sea level rise but also by the strength, structure, and erodibility of the bedrock; and with continued sea level rise the bluff erodes further inland. Preferential erosion of the densely jointed and faulted granitic rock has created the craggy, irregular topography commonly seen along this stretch of coastline. Where strong, erosion resistant bedrock is present, seastacks may form which project above the ocean's surface. A series of elevated marine terraces are present in the northern

Monterey Bay and locally along the areal coastline - testament to the steady tectonic uplift of the region coupled with repeated fluctuations in sea level for the past several hundred thousand years. Highway 1 traverses an elevated marine terrace throughout much of the subject area.

The bluff immediately west of the residence on the property consists of granitic bedrock and is host to a debris fan remnant situated on a degraded wave cut platform (Qf on Plates 1 thru 3). The fan deposits exposed in the upper portion of the bluff are interpreted to be the last remnant of a coastal terrace which extended westward during the last ice age and has been eroded through wave attack and shoreline retreat. The exposed fan deposits are prone to slumping and form a steep arcuate scar across the slope below the homesite. We analyzed several sets of vertical and oblique aerial photographs dating back nearly 100 years to evaluate the history of coastal retreat and slope stability at the site. From our analysis, shoreline retreat at the site is very slow – perhaps one foot every ten years. Throughout the photo record, the steep slope immediately west of the residence has remained essentially unchanged. The bluff underlying the fan deposits consists of strong granitic bedrock, and it appears wave runup occasionally reaches the back edge of the degraded wave cut platform.

Earth Materials and Geologic Structure

The earth materials underlying the subject property consist of Cretaceous age (65 to 145 million years old) granitic bedrock (qd – Figure 3; Plates 1 thru 3) overlain by Pleistocene age terrace deposits approximately 125,000 years old (Qf – Plates 1 thru 3). Our observations of the earth materials underlying the site are in general agreement with the published geologic map by Dibblee (2007) of the subject area except that the locally mapped terrace deposits are more representative of proximal debris fan deposits, not the *marine terrace sand* that Dibblee (2007) denotes in the area (Qm – Figure 3).

We co-logged the exploratory borings advanced by the project geotechnical engineer. The exploratory borings in the vicinity of the residence revealed fill and thin fan deposits overlying quartz diorite (Appendix B; Plates 1 thru 3). The fill was up to 4.5 feet thick where explored and consisted of colluvial soils and bedrock fragments. The native colluvial soils encountered in the borings were up to 3.5 feet thick and consisted of dark brown colored clay, silt, and sand with scattered granitic gravels. Fan deposits at the site consisted of soil and subrounded granitic gravels. The quartz diorite bedrock underlying the site and as encountered in the borings was highly weathered in ungraded areas and became less weathered and very strong with depth. Where graded, less weathered and stronger quartz diorite was encountered at shallower depths. Much of the moderate to steeply sloping portions of the site expose shallow granitic bedrock.

During our field mapping, we observed rounded lag deposits at the base of the very steep erosional scar immediately west of the residence. The lag deposits consisted mostly of rounded, coarse gravel to small boulder sized granitic gravels which are typical of a lag deposit found along the contact between an uplifted shore platform and overlying terrace deposit. The rounded gravels were overlain by fan deposits consisting of angular, clast supported, predominately cobble to large boulder sized rocks of different lithologies. The upper portions of the fan deposits were matrix supported.

The quartz diorite bedrock underlying the site, and the Salinian basement as a whole, has been extensively faulted and sheared, with the north-northwesterly aligned tectonic fabric controlling

the trend of the local shoreline. Dibblee (2007) depicts the subject property as being transected by an inferred fault. As depicted on Figure 3, the fault trends in a northwesterly direction just southwest of the existing homesite and the elongate granitic knoll, and does not offset the marine terrace sand (Qm) mapped to the southeast. The Palo Colorado fault trends north-northwesterly approximately 1,300 feet east of the parcel and is mapped as concealed beneath the marine terrace sand (the terrace is not offset).

Due to its tectonic history, the quartz diorite in the subject area is highly fractured. Notwithstanding the inherent weaknesses and discontinuities in the areal bedrock, the granite underlying the site is strong and very erosion resistant. Planes of weaknesses such as joints, shears, and inactive faults, however, do control the overall configuration of the bluff at the site as it slowly erodes. We did not observe any perched groundwater during our subsurface investigation, and we saw no springs or seeps during our field reconnaissance at the site.

GEOLOGIC HAZARDS

Seismic Shaking

Seismic shaking at the subject site will be strong during the next major earthquake along local fault systems. Modified Mercalli Intensities of up to VI are possible at the site (see Table 1) based on the intensities reported by Lawson et al. (1908) for the Great 1906 San Francisco earthquake and by Stover et al. (1990) for the 1989 Loma Prieta earthquake. It is imperative that seismic shaking be considered in the design of any proposed improvements.

Deterministic Seismic Shaking Analysis

The seismicity of the area is influenced primarily by the northwest-trending San Gregorio-Hosgri fault which passes west of the site. For the purpose of evaluating deterministic peak ground accelerations at the site, we have considered several local and regional faults in addition to the San Gregorio-Hosgri fault zone. While other faults or fault zones in the region are active, their potential contribution to seismic shaking at the site is overshadowed by the high predicted ground accelerations and relatively short recurrence interval of earthquakes along the San Gregorio-Hosgri fault. Table 2 shows the moment magnitude of the characteristic or maximum earthquake, its estimated recurrence interval, and the distance from the causative fault to the site. We took the fault data from "The Uniform California Earthquake Rupture Forecast, Version 2" (WGCEP, 2008), "2008 United States National Seismic Hazard Maps" (Petersen et al., 2008) and "Probabilistic Seismic Hazard Assessment for the State of California" (Petersen et al., 1996).

Also shown on Table 2 are our deterministically derived accelerations for the site. These accelerations are based on attenuation relationships developed from the analysis of historical earthquakes. It is important to understand that shaking estimates of potential future earthquakes are based on the statistical analysis of shaking generated by past earthquakes. The calculated accelerations listed in Table 2 are the best estimates given the current methods and their application to the current database of past earthquakes. Therefore, we caution that the listed values are approximations, rather than precise predictions. Actual measured "free-field" accelerations at the site may be larger. Because the historical data can be interpreted in different ways, there are a number of different attenuation relationships available.

We have employed a set of up to five attenuation relationship models compiled by the Pacific Earthquake Engineering Research Center (PEER, 2015) in estimating the acceleration values. The resulting accelerations listed are based upon numerous factors, including magnitude, closest distance to the rupture plane, fault type (strike slip, normal, or reverse), as well as site soil classification. In addition, the regressions are adapted for the specific setting of shallow crustal earthquakes in active tectonic regions (e.g., western North America). The attenuation models therefore provide region-specific flexibility within the tectonic setting of California. We have not performed site-specific seismic shaking evaluations, and no on-site or laboratory measurements were made to evaluate site-specific seismic response. The values listed, however, do reflect the site soil classification.

TABLE 1
Modified Mercalli Intensity Scale

<p>The modified Mercalli scale is a measure of the intensity of ground shaking as determined from observations of an earthquake's effect on people, structures, and the Earth's surface. The scale assigns a Roman numeral from I to XII to an earthquake event as follows:</p>	
I Not Felt	Not felt except by very few under especially favorable conditions.
II Weak	Felt only by a few people at rest, especially on upper floors of buildings. Some hanging objects may swing.
III Weak	Felt quite noticeably by people indoors, especially on upper floors of buildings: Many people do not recognize it as an earthquake. Standing cars may rock slightly. Vibrations are similar to the passing of a truck, with duration estimated. Hanging objects may swing slightly.
IV Light	Felt indoors by many, outdoors by few during the day: At night, some are awakened. Dishes, windows, and doors are disturbed; walls make cracking sounds. Sensations are like a heavy truck striking a building. Standing cars rock noticeably. Hanging objects swing.
V Moderate	Felt by nearly everyone; many awakened: Some dishes and windows are broken. Unstable objects are overturned. Pendulum clocks may stop.
VI Strong	Felt by all, and many are frightened. Some heavy furniture moved; a few instances of fallen plaster occur. Damage is slight.
VII Very Strong	Damage is negligible in buildings of good design and construction; but slight to moderate in well-built ordinary structures; damage is considerable in poorly built or badly designed structures; Some chimneys are broken.
VIII Severe	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX Violent	Damage is considerable in specially designed structures; well-designed frame structures are thrown out of plumb. Damage is great in substantial buildings, with partial collapse. Buildings are shifted off foundations. Liquefaction occurs.
X Extreme	Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed with foundations. Rails are bent.
XI Extreme	Few, if any masonry structures remain standing. Bridges are destroyed. Broad fissures erupt in the ground. Underground pipelines are rendered completely out of service. Earth slumps and landslides in soft ground. Rails are bent greatly.
XII Extreme	Damage is total. Waves are seen on ground surfaces. Lines of sight and level are distorted. Objects thrown upward into the air.

TABLE 2						
Faults, Earthquakes and Deterministic Seismic Shaking Data						
Fault Segment(s)	Moment Magnitude of Characteristic or Maximum Earthquake (M_w)	Estimated Recurrence Interval (years)	Site Soil Classification	Distance from Site (km)	Estimated Mean Peak Ground Acceleration (g)	Estimated Mean + One Dispersion Ground Acceleration (g)
San Andreas (1906 rupture)	7.9	210	C Very Dense Soil / Soft Rock	58.7	0.11	0.20
Monterey Bay - Tularcitos	7.1	2,800		15.9	0.22	0.46
San Gregorio-Hosgri (Sur segment)	7.0	400		2.2	0.53	0.96

The seismic shaking data provided in Table 2 is provided for informative purposes and may be considered for use in a slope stability analysis performed by the project geotechnical engineer provided our reported values meet or exceed values determined through the methods prescribed by the governing or reviewing agency.

Although a strong earthquake may occur on any number of active faults in the region, we recommend utilizing the accelerations generated by an earthquake on the nearby San Gregorio-Hosgri fault. This is due to the high predicted ground accelerations and the relatively short recurrence interval of the San Gregorio fault zone. Based on the results listed in Table 2, the estimated earthquake ground motion (mean plus one dispersion) at the subject property will be approximately 0.96g resulting from a 7.0 moment magnitude (M_w 7.0) earthquake centered on the San Gregorio fault, about 1¼ miles west of the site. The duration of strong shaking is dependent on magnitude. Bray & Rathje (1998) have suggested a relationship between magnitude, distance, and duration of strong shaking. On the basis of their relationship, the duration of strong shaking at the site associated with a design earthquake on the San Gregorio fault is 14 seconds. For comparison purposes, the duration of strong shaking at the site associated with a design earthquake on the San Andreas fault is about 38 seconds. The duration of seismic shaking associated with a seismic event on the San Andreas fault may be more critical a design parameter than the peak acceleration on the San Gregorio fault.

Fault Ground Surface Rupture

The subject property lies within the San Gregorio-Hosgri fault zone. The main trace of the San Gregorio fault passes offshore west of the site, and several potentially active faults are mapped 1,000 feet or more feet from the parcel (Figures 2 & 3). Dibblee (2007) depicts an inferred fault transecting the property west of the existing residence and roughly parallel to the bluff (Figure 3). As mapped, this fault and another inferred fault to the northeast do not offset the Pleistocene age (approximately 100,000 year old) marine terrace in the vicinity of the site and are considered inactive, by definition. Although the Cretaceous age granitic bedrock at the subject site is highly fractured and in places faulted and sheared, we saw no evidence for active faulting on the subject

property. We saw no fault line scarps or offset of the terrace deposits during our air photo reconnaissance and field mapping of the site. Active faulting is considered to be having been ruptured within the last 11,000 years.

Coastal Erosion

The shoreline along the base of the bluff at the site is subject to direct wave attack and erosion. Oversteepening at the base of the bluff resulting from wave erosion causes episodic failure of the bluff-face. Instability on the upper bluff-face as a consequence of shoreline retreat lags behind the active surf processes below. The oversteep bluff also fails through weathering and erosion, and seismic shaking as it seeks a more stable profile.

From our analysis of aerial photographs of the site which date back to 1929, we estimate the long-term historic rate of coastal bluff erosion at the site has at most been about one foot per ten years. The Scripps Institution of Oceanography (2022) reports that the mean rate of retreat of the bluff-face near the subject site between 2010 and 2016 was less than 0.033 feet per year (one third of a foot in 10 years), and the average rate of retreat of the blufftop for this time interval was nil.

Formal projections of future sea-level rise along the California coast suggest that the rate of coastal erosion below the site will increase over the next century. It is difficult to say with any certainty what future rates of sea level rise will be, but current estimates of sea level rise in the next 100 years anticipate the most rapid rise will be toward the end of the 21st century. Hence, higher rates of bluff retreat will occur toward the end of the century as well. Given the very low bluff erosion rate at the site, a hypothetical 25% increase in the erosion rate over the next century would have a negligible impact on the development during its anticipated lifetime.

Slope Instability

As previously mentioned, the subject property will be subjected to strong ground shaking in the event of a large magnitude earthquake centered on the nearby San Gregorio-Hosgri fault zone. No earthquakes greater than about 6.2 Richter magnitude are known to have occurred historically in the Big Sur area; however, past ground shaking has triggered numerous failures of varying size along the coastal bluffs in the Santa Cruz region. In 1989, for example, the Loma Prieta earthquake generated numerous coastal bluff failures in the Santa Cruz area. Review of the local newspaper coverage (Youd and Hoose, 1978), and the Carnegie Commission Report (Lawson et al., 1908) of the 1906 earthquake found no documented accounts of large-scale sea cliff failure in Santa Cruz County due to the earthquake, though there was much sloughing of "earth" from the bluffs near Capitola (Lawson et al., 1908, p. 272).

Deep-seated landsliding, incorporating a large portion of, or the entire slope at the site is possible; however, the initiation of new large landslides is quite rare. The fractured quartz diorite underlying the subject area may be prone to landsliding where adversely dipping joints or shears underlie the slope, however, the lack of topographic evidence indicative of preexisting large, deep-seated landslides (i.e., scarps, bowl-shaped swales, hummocky topography) suggests large-scale landsliding has not occurred at the subject site. We could not feasibly map the bedrock structure of the entire bluff at the site, but it should be noted that the overall configuration of the bedrock bluff is controlled by its structure and the main force controlling the morphology of the bluff is wave attack at its base.

The tall steep seaward portion of the bluff at the site is subject to instability under seismic and aseismic conditions. Shallow topples within the quartz diorite bedrock and slumping of the remnant fan deposits are the chief process affecting the oversteepened bluff-face and blufftop at the site as it adjusts to long-term erosion at its toe. The colluvium and subjacent fan deposits which comprise the uppermost portion of the steep bluff west of the residence are also susceptible to slumping and erosion under saturated conditions.

We identified a relatively small erosional scar immediately west of the existing residence during our site reconnaissance and air photo analysis of the site (Plate 1). The upper portion of the scar exposes remnant fan deposits, and lag gravels are present at its base. The lag gravels indicate that the fan deposits rest on the back edge of an ancient shore platform. The erosional scar appears to have been in existence for a very long time; with piecemeal slumping of the fan deposits likely occurring during periods of intense prolonged rainfall and possibly strong regional earthquakes. We saw no significant enlargement of the erosional feature during the nearly 100 year aerial photographic record of the site.

For determining setback and/or foundation recommendations for the proposed new residences, we conducted geologic mapping of the site and surveyed several geologic cross sections through the proposed development areas on the property. We projected collected subsurface data onto our cross sections to analyze the morphology and configuration of the slopes. We utilized the site topographic map and current proposed project plans to assist with our analysis (Plates 1 thru 3). To determine the 100-year bluff setback for the site, we assumed the bluff-face above the degraded shore platform will retreat 10 feet over the next 100-years. The 100-year bluff profile and setback is depicted on Plates 1 thru 3.

In our opinion, the risk of bluff retreat and shallow landsliding to affect improvements situated too close to the steep bluff-face at the site is high. However, the likelihood of landsliding and/or bluff retreat to impact well founded and/or adequately set back improvements at the site during the project lifetime is low.

CONCLUSIONS

The subject property is located at 36240 Highway 1 and is comprised of a granitic knoll (a fossil seastack) and a lower terrace between Highway 1 and a steep coastal bluff above the Pacific Ocean. The existing residence at the site was constructed circa 1964 on a cut/fill pad excavated into the edge of the granitic knoll. A gentle slope descends northward from the residence to the lower terrace where an accessory dwelling unit is proposed. An erosional scar on the upper portion of the coastal bluff lies seaward of the proposed residence.

Bedrock underlying the site consists of Salinian block quartz diorite. The granitic bedrock is overlain by relatively thin Pleistocene fan deposits and colluvial soils. Remnant fan deposits and the underlying granitic bedrock are exposed in the erosional scar seaward of the residence.

The oversteepened bluff-face bordering the western portion of the parcel is prone to instability resulting from slow, gradual coastal erosion and periodic regional earthquakes. The long term average erosion rate at the site is less than one foot in 10 years.

The site is located in an area of high seismic activity and will be subject to strong seismic shaking in the future. Modified Mercalli Intensities of up to VI are possible. The controlling seismogenic source for the subject property is the San Gregorio-Hosgri fault, about 1¼ miles to the west. The design earthquake magnitude anticipated on this fault is M_w 7.0, with an expected duration of strong shaking of about 14 seconds. Deterministic seismic shaking analysis for the site yields an estimated ground acceleration of 0.93g (mean peak plus one dispersion).

Provided the design and construction of the proposed improvements is carried out in accordance with our recommendations and the recommendations of the project geotechnical engineer, the improvements at the site will be subject to "ordinary" risks (as defined in Appendix C). Appendix C should be reviewed in detail by the property owner to determine whether an "ordinary" level of risk is acceptable. If "ordinary" risks as defined are unacceptable, then the geologic hazards in question should be further mitigated to reduce the corresponding risks to a lower level.

RECOMMENDATIONS

1. Foundations for the new residence shall either be set back beyond the surface projection of the 100-year setback line depicted on Plate 1, and/or penetrate below the 100-year setback line depicted in profile view on Plates 2 and 3, and be embedded into competent bedrock. The residence, its basement, and the accessory dwelling unit shall be founded according to the recommendations of the project geotechnical engineer.

We must observe and inspect all excavations and pierholes prior to the installation of any rebar or concrete, or placement of any fill. We must be notified a minimum of seven days prior to any drilling or excavation. Any unexpected geologic conditions encountered during drilling or excavation may require supplemental recommendations by our firm.

We recommend that a grading contractor familiar with excavating and shoring into strong competent granite should be considered for foundation work for the project. Additionally, excavation conditions near the edge of the bluff may encounter loose earth materials and may require hand-dug excavations to embed foundations into granitic bedrock at depth.

2. All drainage from improved or impervious surfaces, such as walkways, patios, roofs, and driveways on the property should be collected in impermeable gutters or pipes and discharged in an area where it will not cause erosion of the loose underlying soils. At no time should any concentrated drainage be released onto the ground surface above or adjacent the residences. The control of runoff at the site is essential for minimizing the potential for erosion, shallow landsliding, and infiltration resulting from ponding at the site.
3. We request the privilege of reviewing all geotechnical, civil, and structural engineering; and drainage and architectural reports and plans pertaining to the proposed mitigation measures.

INVESTIGATION LIMITATIONS

1. The conclusions and recommendations contained herein are based on probability and in no way imply that the proposed development will not possibly be subjected to ground failure, seismic shaking, coastal erosion, faulting or landsliding of such a magnitude that

it overwhelms the site. The report does suggest that using the site for residential purposes in compliance with the recommendations contained herein is an acceptable risk.

2. This report is issued with the understanding that it is the duty and responsibility of the owner or his representative or agent to ensure that the recommendations contained in this report are brought to the attention of the architect and engineers for the project, incorporated into the plans and specifications, and that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.
3. If any unexpected variations in soil conditions or if any undesirable conditions are encountered during construction, Easton Geology, Inc. should be notified so that supplemental recommendations may be given.

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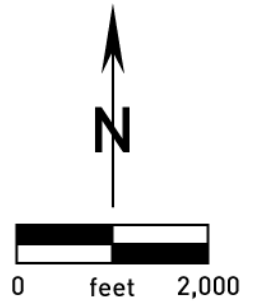
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APPENDIX A

FIGURES 1 through 3



Contour interval = 40 feet.

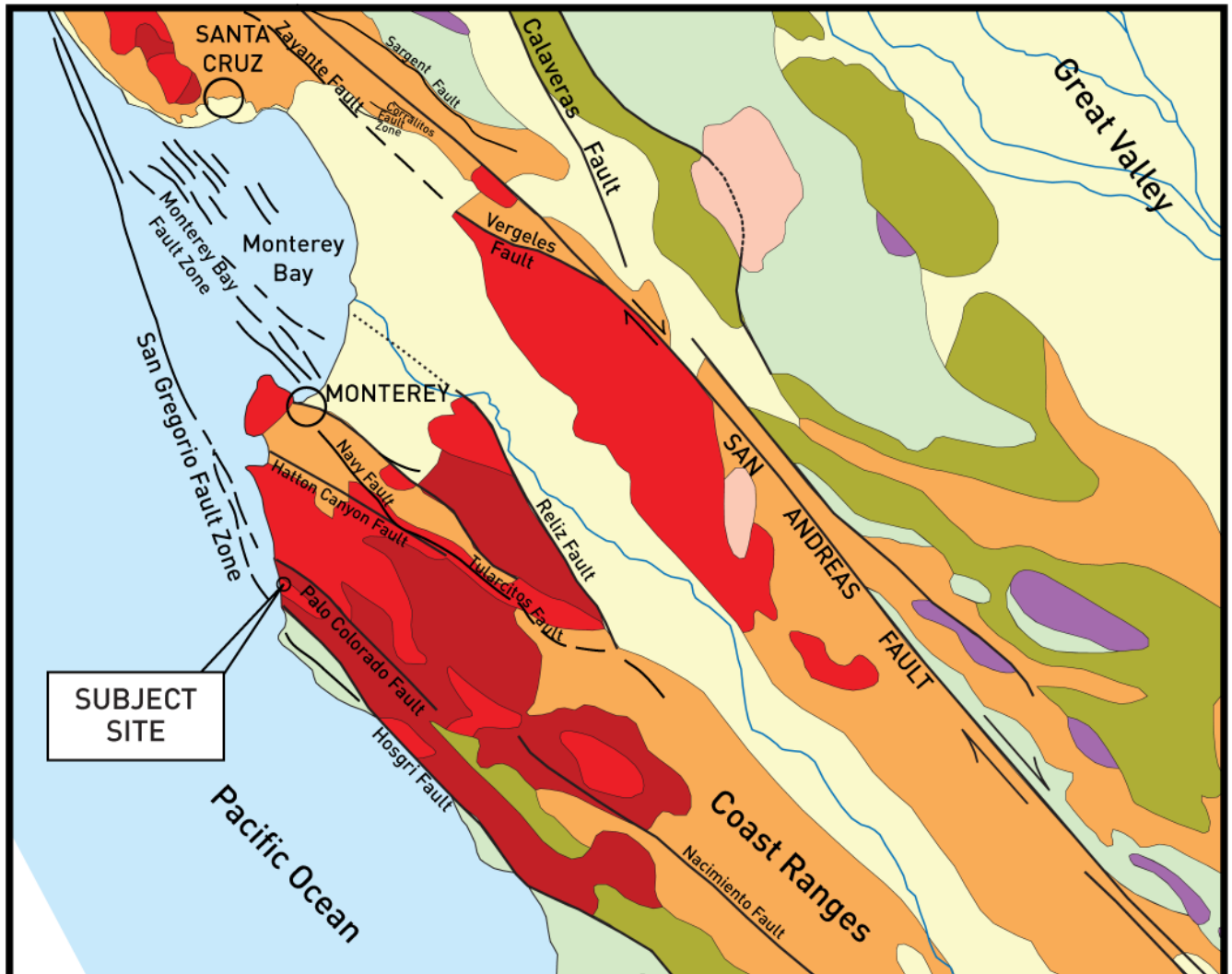


Base Map: U.S. Geological Survey, 2012, Soberanes Point Quadrangle, California, 7.5-Minute Series.

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SITE LOCATION MAP
 Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

FIGURE #
1
 JOB #
 C21014



EXPLANATION

This map is based on the Simplified Geologic Map of California, Map Sheet 97

SEDIMENTARY AND VOLCANIC ROCKS

- Cenozoic nonmarine (continental) sedimentary rocks and alluvial deposits
- Cenozoic marine sedimentary rocks
- Cenozoic volcanic rocks

INTRUSIVE AND IGNEOUS METAMORPHIC ROCKS

- Granitic rocks - chiefly Mesozoic
- Serpentinized ultramafic rocks - chiefly Mesozoic
- Pre-Cenozoic metamorphic rocks of unknown age
- Late Mesozoic (latest Jurassic and Cretaceous) marine sedimentary rocks; Great Valley Sequence and related rocks
- Late Mesozoic (latest Jurassic and Cretaceous) rocks of the Franciscan Complex

kilometers

0 10 20 30 40 50



miles

SYMBOLS

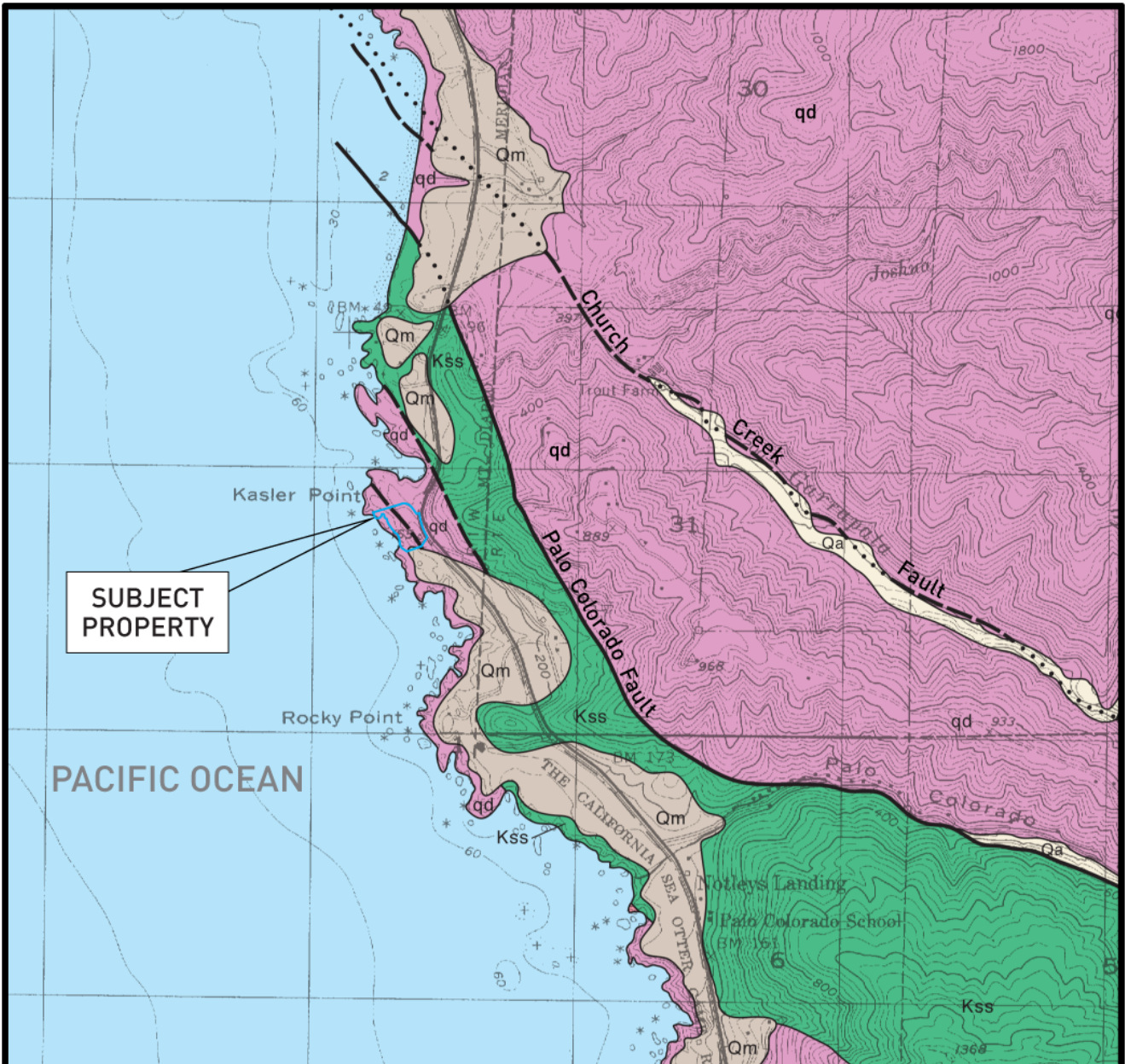
- Contact
- Fault - dotted where concealed; arrows indicate relative movement on strike-slip faults



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REGIONAL GEOLOGIC MAP
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FIGURE #
2
JOB #
C21014



EXPLANATION

- Qa Surficial Sediments - alluvium
- Qm Older Surficial Sediments - marine terrace sand
- Kss Unnamed marine sedimentary rocks - hard buff sandstone, cobble conglomerate, and micaceous shale
- qd Granitic Rocks - biotite-hornblende quartz diorite to granodiorite

-  Fault, dashed where inferred, dotted where concealed
-  Geologic contact, dashed where inferred



Base Map: Dibblee, T.W., 2007, Geologic Map of the Soberanes Point and Mount Carmel Quadrangles, Monterey County, California.

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LOCAL GEOLOGIC MAP
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FIGURE #
3
JOB #
C21014

APPENDIX B

LOGS OF EXPLORATORY BORINGS 1 through 8

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LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
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BORING #

B-1

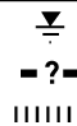
JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type	Description
			1.5 inches of asphalt concrete driveway surface
1		L 50/6"	Lightly Weathered Quartz Diorite - becoming unweathered with depth
2		T 50/5"	Light olive brown (2.5Y 5/4) sand to fine gravel sized angular grains of granite, weak to strong, slightly moist, moderately weathered, with dark red iron oxide staining along fracture surfaces.
3			
4			Hard drilling.
5			
6		T 50/4"	Grayish brown to dark grayish brown (2.5Y 5/2 to 4/2) angular, disaggregated fine to medium grained grains and gravel sized clasts of granite, 'platey' appearance resulting from sampling, micaceous, weak to friable as a result of sampling.
7			
8			Harder drilling.
9			Cuttings are powdery.
10			
11		T 50/2"	Light yellowish brown to light brownish gray (2.5Y 6/4 to 6/2) medium to coarse grained granite, moderately strong, dry.
12			
13			Hard drilling.
14			
15		T 50/1"	Medium to strong lightly weathered quartz diorite, angular broken clasts resulting from sampling.
			Bottom of boring at 15.1 feet, no groundwater encountered.
16			
17			
18			
19			
20			
21			

Boring depth: 15.1 feet
 Logged by: GFE
 Date drilled: 2-17-22
 Boring type: 8" Hollow Stem

Explanation:

- T Terzaghi sample
- M Medium sample
- L Large sample



Free Water Elevation
 Earth materials contact, queried where uncertain
 Gradational contact

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LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-2

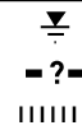
JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type	Description
1			Topsoil/Fill?
2		L 22	Upper liner: Dark grayish brown (2.5Y 4/2) stiff sandy clay to clayey sand with occasional fine grains of angular granite. Middle and lower liner: Matrix to clast supported angular clasts of granite to 1/2 inch diameter with clayey sand matrix.
3		L 22	
4		L 22	Highly Weathered Quartz Diorite
5		T 17	
6		T 18	Light yellowish brown (2.5Y 6/4) fine to medium grained highly weathered granite with soil infilled fractures.
7		T 33	
8			
9			
10		L 50/3"	Less Weathered Quartz Diorite - becoming unweathered with depth
11			No recovery.
12		T 50/3"	Highly fractured, moderately strong quartz diorite, dry.
13			Hard drilling.
14			
15			
16			
17			
18			
19			
20			
21		T 50/1"	Strong quartz diorite, powdered from sampling, fracturing is likely both natural and sampler induced.
			Bottom of boring at 10.1 feet, no groundwater encountered.

Boring depth: 10.1 feet
 Logged by: GFE
 Date drilled: 2-17-22
 Boring type: 8" Hollow Stem

Explanation:

- T Terzaghi sample
- M Medium sample
- L Large sample



- Free Water Elevation
- Earth materials contact, queried where uncertain
- Gradational contact

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LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-3

JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type*	Description
1	? ?	L 16	Topsoil Very dark brown (10YR 2/2) clayey sand to sandy clay with occasional clasts of 1 inch diameter highly weathered granite - sand derived from quartz diorite, medium dense to stiff, slightly moist.
2		L 28	
3	? ?	M 16	Remnant alluvial fan/terrace? Strong brown (7.5YR 4/6) micaceous gravelly sandy clay with some subrounded fine granitic gravel.
4		M 18	
5		T 30	Light gray (10YR 7/2) angular (broken) 1 inch clasts of moderately strong to strong quartz diorite, dry, slight iron oxide staining on fracture surfaces (sampled through qd boulder).
6		T 30	
7		L 30	Highly Weathered Quartz Diorite Large sample captured bottom 12 inches of previous T sample (T overdriven or not drilled out?) - true depth of sample unknown. Strong brown (7.5YR 5/6) highly weathered in-place quartz diorite. Large sample also appears overdriven.
8		L 30	
9		M 27	Color consistent, with zones of coarse quartz rich angular gravel sized clasts of granite, with relict shear fabric (very old).
10		M 36	
11		T 41	Material consistent - slightly less weathered and increase in relict shear fabric, fabric is laminar, contorted to undulatory.
12		T 50/5"	
12			Bottom of boring at 11.75 feet, no groundwater encountered.
13			
14			
15			
16			
17			
18			
19			
20			
21			

Boring depth: 11.75 feet

Logged by: GFE

Date drilled: 2-17-22

*Boring type: 3" Hand Auger - 70# hammer

Explanation:

T Terzaghi sample

M Medium sample

L Large sample



Free Water Elevation



Earth materials contact, queried where uncertain



Gradational contact

EASTON GEOLOGY, INC.

P.O. Box 3533
 Santa Cruz, California 95063
 831.247.4317

LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-4

JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type*	Description
			Topsoil
1		6	Black (10YR 2/1) clayey sand - A soil horizon.
2		13	Shoe - very dark grayish brown (10YR 3/2) sandy clay, slightly moist.
		23	
		11	
3		12	Remnant alluvial fan/terrace?
		15	Shoe - similar material - with fine subrounded gravel sized clasts of granite.
4		11	Very Highly Weathered Quartz Diorite
		12	Strong brown (7.5YR 4/6) sandy clay with gray (7.5YR N5/) clay lined seams (dessication cracks or relict joint infill), faint relict bedrock structure, no soil structure apparent.
5		17	
		15	
6		34	Material consistent - clay and sand, slightly less weathered, stiff, slightly moist.
	45		
7	15	Weathered Quartz Diorite	
	23	Increasing relict structure with sharp decrease in gray clay linings.	
8	37		
	15	Strong brown (7.5YR 5/8) weathered quartz diorite, fine to coarse grains with coarse angular gravel sized clasts of fractured granite (mechanical breakage) increasing relict structure, friable, slightly moist.	
9	25		
	18		
10			
	14	Material consistent - zones of more and less weathered granite, friable.	
11	15		
	28		
12		Olive yellow (2.5Y 6/6) weathered quartz diorite with gray to dark gray (2.5Y N5/ to N4/) firm plastic clay, clay infills fractures, friable with some coarse angular unweathered clasts of granite.	
	26		
13	40		
	45		
14			Bottom of boring at 13.9 feet, no groundwater encountered.
15			
16			
17			
18			
19			
20			
21			

Boring depth: 13.9 feet

Logged by: GFE

Date drilled: 2-17-22

*Boring type: 3" Hand Auger - 70# hammer

Explanation:

T Terzaghi sample

M Medium sample

L Large sample



Free Water Elevation



Earth materials contact, queried where uncertain



Gradational contact

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LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-5

JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type*	Description
1			Topsoil 12 inches of dark loose topsoil, becoming firmer below 1 foot.
2		L 17	Shoe - mottled yellowish brown (10YR 5/4) and very dark grayish brown (10YR 3/2) clay and sand, slightly moist, medium dense to stiff, roots.
3		M 17	Clayey medium to coarse grained sand with fine gravel. Shoe - similar material - with fine subrounded gravel sized clasts of granite.
4		T 50/6"	Highly Weathered Quartz Diorite - becoming less weathered with depth Brown (10YR 5/3) mechanically fractured (sampler) and highly fractured fine to coarse gravel sized angular clasts of weathered granite, sample overdriven.
5		L 50/6"	Weathered in place granite, friable, iron oxide staining, L sample captured previous T.
6		M 50/6"	Dark yellowish brown (10YR 4/4) weathered micaceous granite, friable to weak to strong, slightly moist - M and T samples are consistent.
6		T 50/6"	
6			Bottom of boring at 6.0 feet, no groundwater encountered.
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Boring depth: 6.0 feet

Logged by: GFE

Date drilled: 2-18-22

*Boring type: 3" Hand Auger - 70# hammer

Explanation:

T Terzaghi sample

M Medium sample

L Large sample



Free Water Elevation



Earth materials contact, queried where uncertain



Gradational contact

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LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-6

JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type*	Description
			Artificial fill
1		L 6	Large cobble sized angular clasts of quartz diorite with matrix of topsoil, clast supported.
		L 10	
2		L 10	
		M 13	Material consistent
3		M 7	
		T 7	Topsoil
4		T 8 15	Having difficulty advancing T sample due to large strong granitic clasts, resample with L
		T 8 L 21	Black (10YR 2/1) silty clayey sand with organics, roots, occasional weathered granite
5		T 9 23	gravels.
6		L 12	Upper portion of sample is dark grayish brown (2.5Y 4/2) stiff clay with sand and scattered granitic clasts (B-soil).
		L 20	
7		L 49	Highly Weathered Quartz Diorite - becoming less weathered with depth
		M 50/6"	Bottom 6 inches of L sample is brownish yellow (10YR 6/8) highly weathered in place
8		T 50/6"	quartz diorite, friable with coarse gravel sized angular clasts, slightly moist.
9			M sample is brownish yellow (10YR 6/8) weathered to highly weathered in place granite, friable to weak.
10			T sample - Consistent - with red iron oxide mottling/staining, friable.
11			Bottom of boring at 8.0 feet, no groundwater encountered.
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Boring depth: 8.0 feet

Logged by: GFE

Date drilled: 2-18-22

*Boring type: 3" Hand Auger - 70# hammer

Explanation:

T Terzaghi sample

M Medium sample

L Large sample



Free Water Elevation



Earth materials contact, queried where uncertain



Gradational contact

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LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-7

JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type*	Description
1			Artificial fill
2		L 5 L 12 L 15	Mixed soil and clasts of strong quartz diorite.
3		M 15 M 20	
4		T 20 L 15	Topsoil Bottom 3 to 4 inches of M sample are native topsoil.
5		T 14 L 30 L 50/6"	Top 2 inches of T sample is topsoil, brown (10YR 4/3) fine to coarse clayey sand with zones of whitish coarse gravel. Very highly weathered quartz diorite in remainder of sample.
6		M 50/6"	Weathered Quartz Diorite - becoming less weathered with depth
7			Pinkish white to reddish yellow (7.5YR 8/2 to 6/6) highly fractured, moderately strong to weak weathered in place granite, dry to slightly moist, angular clasts to 2.5 to 3 inches, becomes less weathered with depth.
8			Bottom of boring at 6.0 feet, no groundwater encountered.
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Boring depth: 6.0 feet

Logged by: GFE

Date drilled: 2-18-22

*Boring type: 3" Hand Auger - 70# hammer

Explanation:

T Terzaghi sample

M Medium sample

L Large sample



Free Water Elevation



Earth materials contact, queried where uncertain



Gradational contact

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 Santa Cruz, California 95063
 831.247.4317

LOG OF EXPLORATORY BORING

Desai Property
 36240 Highway 1
 Big Sur, California
 Monterey County APN 243-251-011-000

BORING #

B-8

JOB #
 C21014

Depth (ft)	Graphic Log	Sample and Type*	Description
1			Artificial fill
2		L 18	Sandy and gravelly, no soil matrix.
		L 19	Shoe - yellowish brown (10YR 5/6) medium to coarse grained silty sand with coarse
		L 38	angular granitic gravels, slightly moist.
3		M 5	Weathered Quartz Diorite - becoming less weathered with depth
		M 5	Clayey sand to sand with clay, sand sized grains of weathered disaggregated quartz diorite,
		M 6	soft, very friable, frequent rootlets.
4		T 12	Yellowish brown to light grayish brown (10YR 5/4 to 6/2) weathered in place quartz diorite,
		T 15	with moderate to lightly weathered zones of granite, friable to moderately strong, dry to
		M 50/6"	slightly moist.
		M 50/4"	Material consistent - with light pinkish white strong angular granite.
		T 50/4"	
6			
7			Bottom of boring at 6.2 feet, no groundwater encountered.
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			

Boring depth: 6.2 feet

Logged by: GFE

Date drilled: 2-18-22

*Boring type: 3" Hand Auger - 70# hammer

Explanation:

T Terzaghi sample

M Medium sample

L Large sample



Free Water Elevation



Earth materials contact, queried where uncertain



Gradational contact

APPENDIX C

SCALE of ACCEPTABLE RISKS from GEOLOGIC HAZARDS

SCALE OF ACCEPTABLE RISKS FROM SEISMIC GEOLOGIC HAZARDS		
Risk Level	Structure Types	Extra Project Cost Probably Required to Reduce Risk to an Acceptable Level
Extremely low ¹	Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intake systems, plants manufacturing or storing explosives or toxic materials.	No set percentage (whatever is required for maximum attainable safety).
Slightly higher than under "Extremely low" level. ¹	Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police, and emergency communication facilities; fire station; and critical transportation elements such as bridges and overpasses; also dams.	5 to 25 percent of project cost. ²
Lowest possible risk to occupants of the structure. ³	Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings such as fire stations, secondary utility structures, extremely large commercial enterprises, most roads, alternative or non-critical bridges and overpasses.	5 to 15 percent of project cost. ⁴
An "ordinary" level of risk to occupants of the structure. ^{3,5}	The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.	1 to 2 percent of project cost, in most cases (2 to 10 percent of project cost in a minority of cases). ⁴
<p>¹ Failure of a single structure may affect substantial populations.</p> <p>² These additional percentages are based on the assumptions that the base cost is the total cost of the building or other facility when ready for occupancy. In addition, it is assumed that the structure would have been designed and built in accordance with current California practice. Moreover, the estimated additional cost presumes that structures in this acceptable risk category are to embody sufficient safety to remain functional following an earthquake.</p> <p>³ Failure of a single structure would affect primarily only the occupants.</p> <p>⁴ These additional percentages are based on the assumption that the base cost is the total cost of the building or facility when ready for occupancy. In addition, it is assumed that the structures would have been designed and built in accordance with current California practice. Moreover, the estimated additional cost presumes that structures in this acceptable-risk category are to be sufficiently safe to give reasonable assurance of preventing injury or loss of life during and following an earthquake, but otherwise not necessarily to remain functional.</p> <p>⁵ "Ordinary risk": Resist minor earthquakes without damage; resist moderate earthquakes without structural damage, but with some non-structural damage; resist major earthquakes of the intensity or severity of the strongest experienced in California, without collapse, but with some structural damage as well as non-structural damage. In most structures it is expected that structural damage, even in a major earthquake, could be limited to repairable damage. (Structural Engineers Association of California)</p> <p>Source: <i>Meeting the Earthquake</i>, Joint Committee on Seismic Safety of the California Legislature, Jan. 1974, p.9.</p>		

SCALE OF ACCEPTABLE RISKS FROM NON-SEISMIC GEOLOGIC HAZARDS⁶		
Risk Level	Structure Type	Risk Characteristics
Extremely low risk	Structures whose continued functioning is critical, or whose failure might be catastrophic: nuclear reactors, large dams, power intake systems, plants manufacturing or storing explosives or toxic materials.	1. Failure affects substantial populations, risk nearly equals nearly zero.
Very low risk	Structures whose use is critically needed after a disaster: important utility centers; hospitals; fire, police, and emergency communication facilities; fire station; and critical transportation elements such as bridges and overpasses; also dams.	1. Failure affects substantial populations. Risk slightly higher than 1 above.
Low risk	Structures of high occupancy, or whose use after a disaster would be particularly convenient: schools, churches, theaters, large hotels, and other high rise buildings housing large numbers of people, other places normally attracting large concentrations of people, civic buildings such as fire stations, secondary utility structures, extremely large commercial enterprises, most roads, alternative or non-critical bridges and overpasses.	1. Failure of a single structure would affect primarily only the occupants.
"Ordinary" risk	The vast majority of structures: most commercial and industrial buildings, small hotels and apartment buildings, and single family residences.	<ol style="list-style-type: none"> 1. Failure only affects owners /occupants of a structure rather than a substantial population. 2. No significant potential for loss of life or serious physical injury. 3. Risk level is similar or comparable to other ordinary risks (including seismic risks) to citizens of coastal California. 4. No collapse of structures; structural damage limited to repairable damage in most cases. This degree of damage is unlikely as a result of storms with a repeat time of 50 years or less.
Moderate risk	Fences, driveways, non-habitable structures, detached retaining walls, sanitary landfills, recreation areas and open space.	<ol style="list-style-type: none"> 1. Structure is not occupied or occupied infrequently. 2. Low probability of physical injury. 3. Moderate probability of collapse.
⁶ Non-seismic geologic hazards include flooding, landslides, erosion, wave runup and sinkhole collapse		

NOTES: (surveyor)

THIS MAP PORTRAYS THE SITE AT THE TIME OF THE SURVEY AND DOES NOT SHOW SOILS OR GEOLOGY INFORMATION, UNDERGROUND CONDITIONS, EASEMENTS, ZONING OR REGULATORY INFORMATION OR ANY OTHER ITEMS NOT SPECIFICALLY REQUESTED BY THE PROPERTY OWNER.

THERE MAY BE EASEMENTS OR OTHER RIGHTS, RECORDED OR UNRECORDED, AFFECTING THE SUBJECT PROPERTY WHICH ARE NOT SHOWN HEREON.

UNDERGROUND UTILITIES, IF ANY, WERE NOT LOCATED. INFORMATION REGARDING UNDERGROUND UTILITY LOCATIONS SHOULD BE OBTAINED FROM THE APPROPRIATE UTILITY COMPANIES OR PUBLIC AGENCIES.

ELEVATIONS ARE BASED ON AN ARBITRARILY ASSUMED DATUM AS NOTED.

GROUND MAY BE MORE IRREGULAR THAN CONTOURS INDICATE. DISTANCES ARE EXPRESSED IN FEET AND DECIMALS THEREOF.

THE CROSS SYMBOL (+) MARKS THE HORIZONTAL POSITION OF THE SPOT ELEVATION SHOWN.

TREE SYMBOLS ARE DRAWN TO SCALE ONLY APPROXIMATELY.

CO = CLEAN OUT HB = HOSEBIB
 EV = ELECTRIC VAULT ICV = IRRIGATION CONTROL VALVE
 ML = METAL LID RP = ROOF PEAK
 F1P = FOUND 1/2" IRON PIPE F3P = FOUND 3/4" IRON PIPE
 10 C = 10" CYPRESS TREE 10 E = 10" EUCALYPTUS TREE
 10 OR = 10" ORNAMENTAL TREE

⊕ SET LATH AT APPROXIMATE BOUNDARY LINE

—○—○— FENCE LINE

LOT COVERAGE (INCLUDING STABLE AND SHED):

3048 S.F. +/- (2%)

FLOOR AREA RATIO: 3048 S.F. (2%)

IMPERVIOUS COVERAGE: 4656 S.F. +/- (3%)

GEOLOGIC MAP EXPLANATION

Symbols

- ? — ? Geologic contact - dashed where approximate, queried where uncertain.
- ⊕ B-8 Exploratory boring (advanced 17 February 2022; Rock Solid Engineering).
- Top of scarp.
- 20% Slope gradient and direction.
- Cut slope.
- Fill slope.
- F F' Geologic cross-section line.

Earth Materials

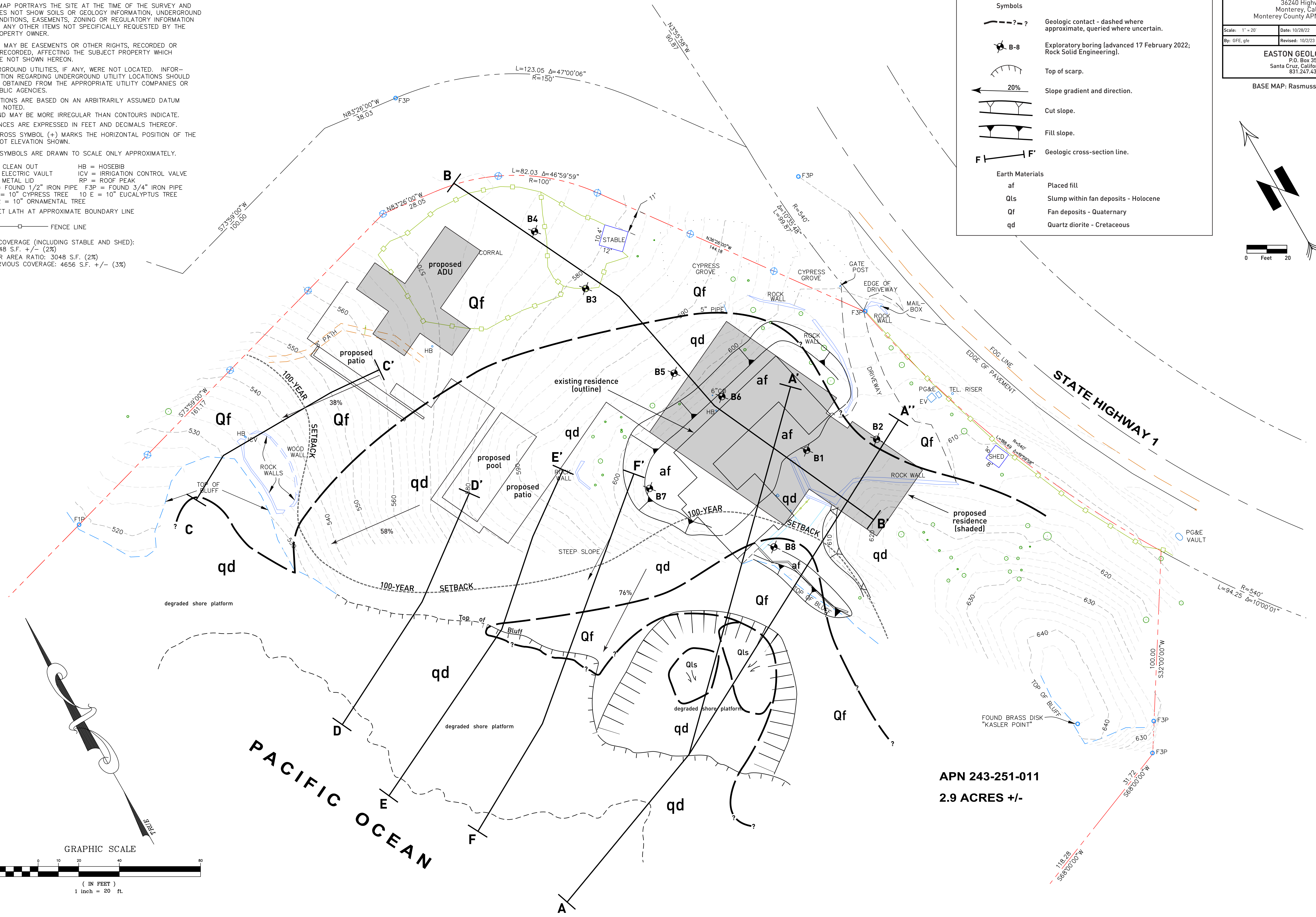
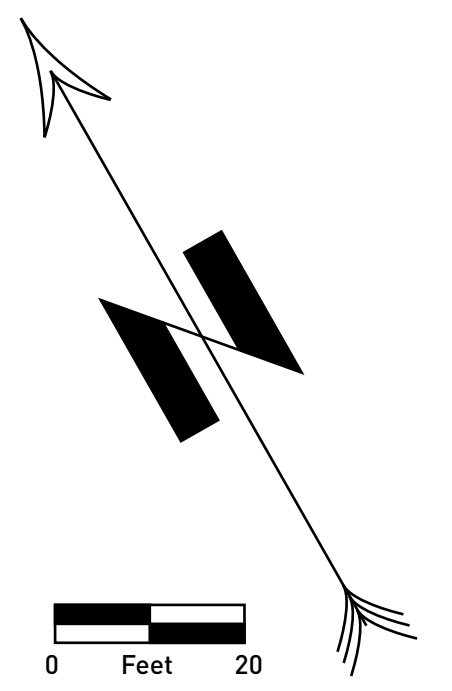
- af Placed fill
- Qls Slump within fan deposits - Holocene
- Qf Fan deposits - Quaternary
- qd Quartz diorite - Cretaceous

SITE GEOLOGIC MAP
 Desai Property
 36240 Highway 1
 Monterey, California
 Monterey County APN 243-251-011

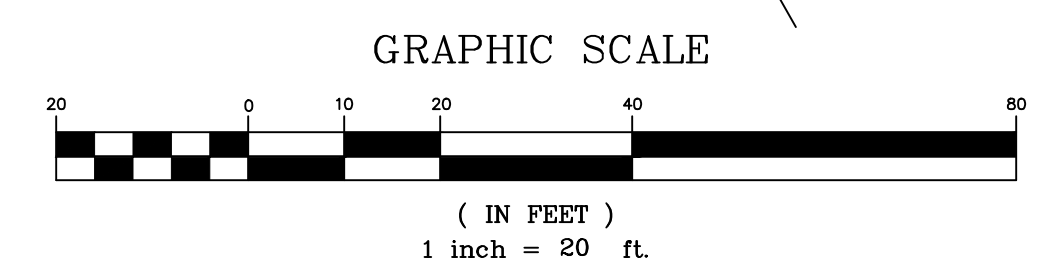
Scale: 1" = 20'	Date: 10/28/22	Project #	Drawing Number
By: GFE, glr	Revised: 10/2/23	G21014	PLATE 1

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 Santa Cruz, California 95063
 831.247.4317

BASE MAP: Rasmussen Land Surveying, 2013

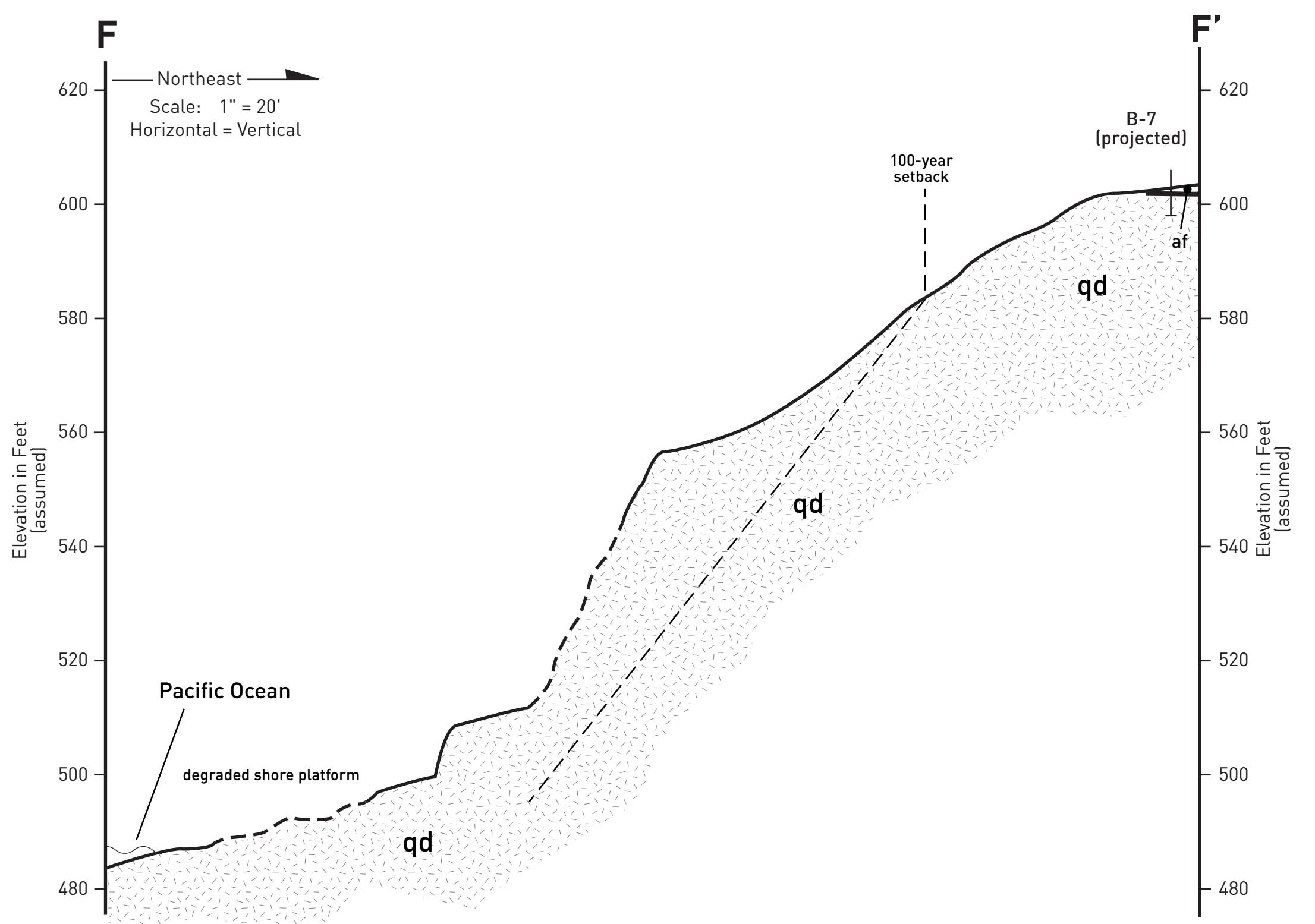
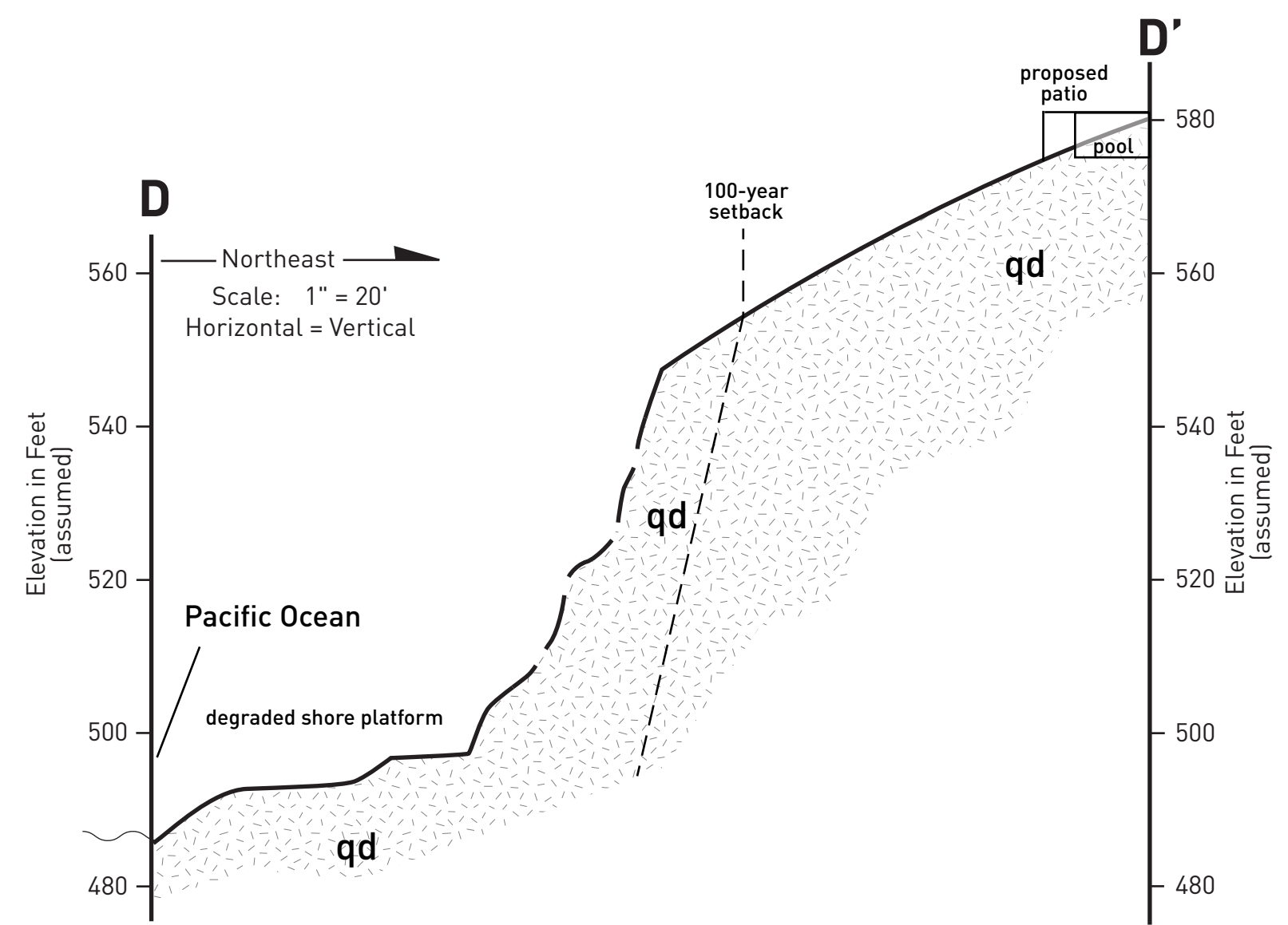
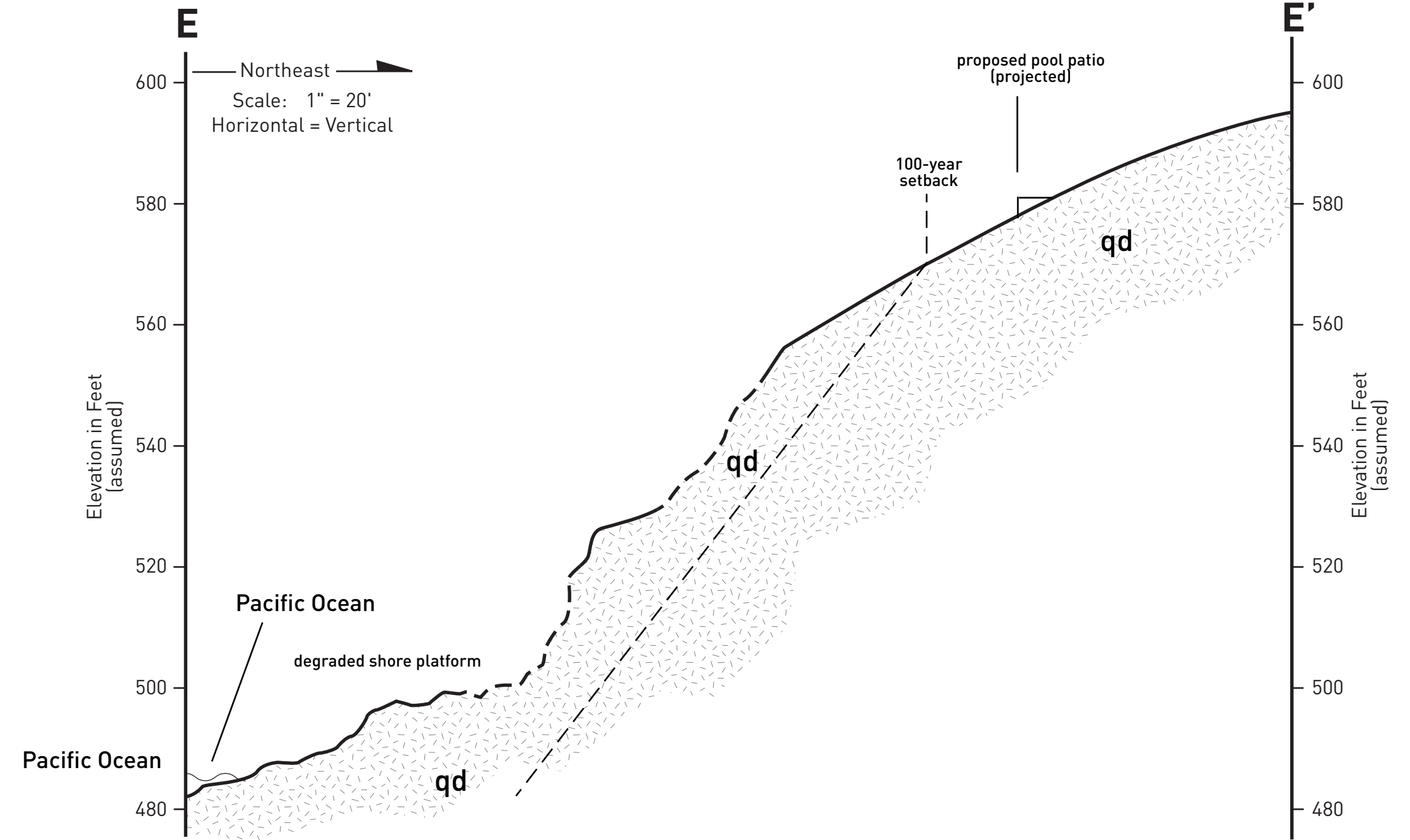
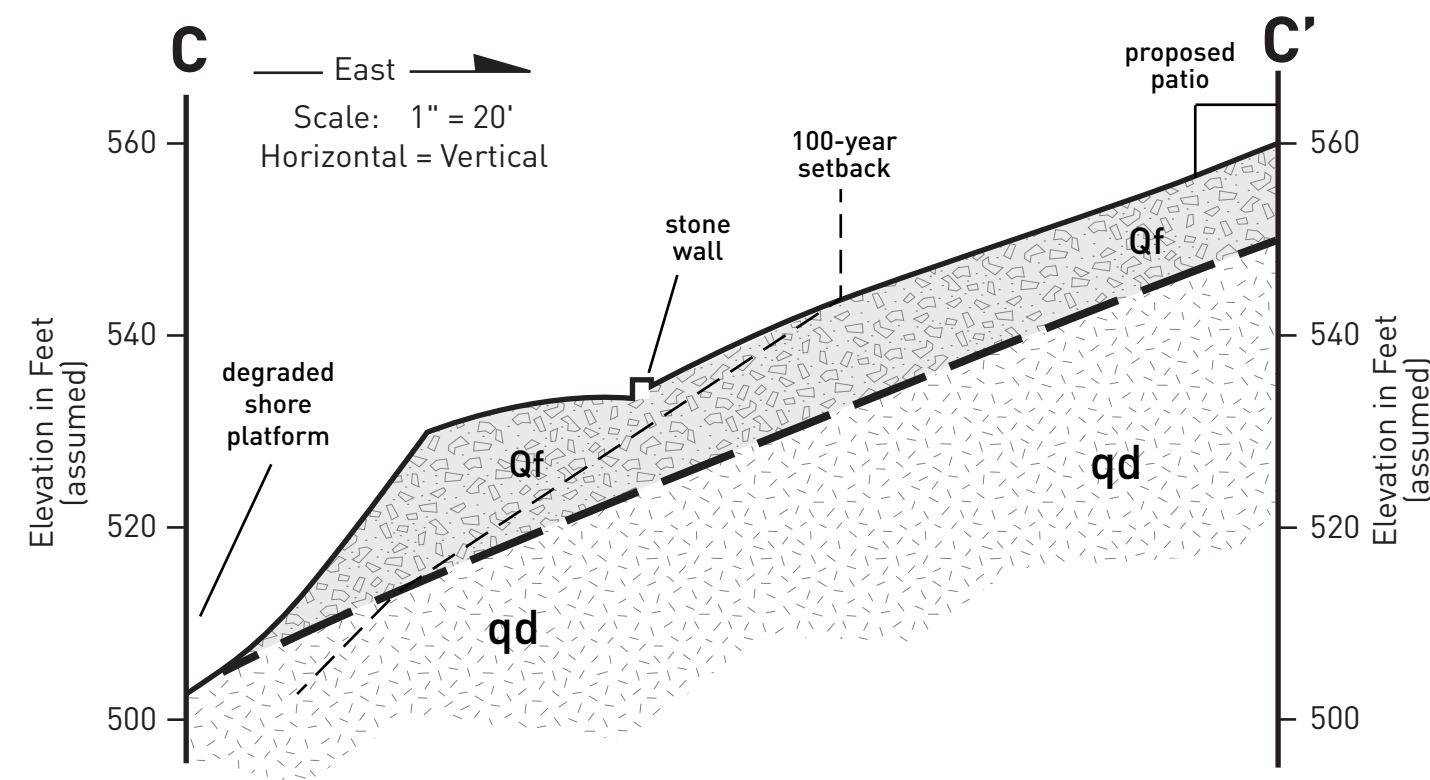


APN 243-251-011
2.9 ACRES +/-



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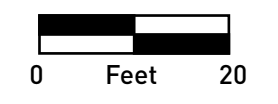


SYMBOLS		EARTH MATERIALS	
	Geologic contact - dashed where approximate, queried where uncertain.	af	Placed fill
	Exploratory boring (advanced 17 February 2022; Rock Solid Engineering).	Qls	Slump within fan deposits - Holocene
B-8		Qf	Fan deposits - Quaternary
		qd	Quartz diorite - Cretaceous

GEOLOGIC CROSS-SECTIONS C, D, E, F
Desai Property
36240 Highway 1
Monterey, California
Monterey County APN 243-251-011

Scale: 1" = 20' H=V	Date: 10/2/23	Project #	Drawing Number
By: GFE, gfe	Revised:	G21014	PLATE 2

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