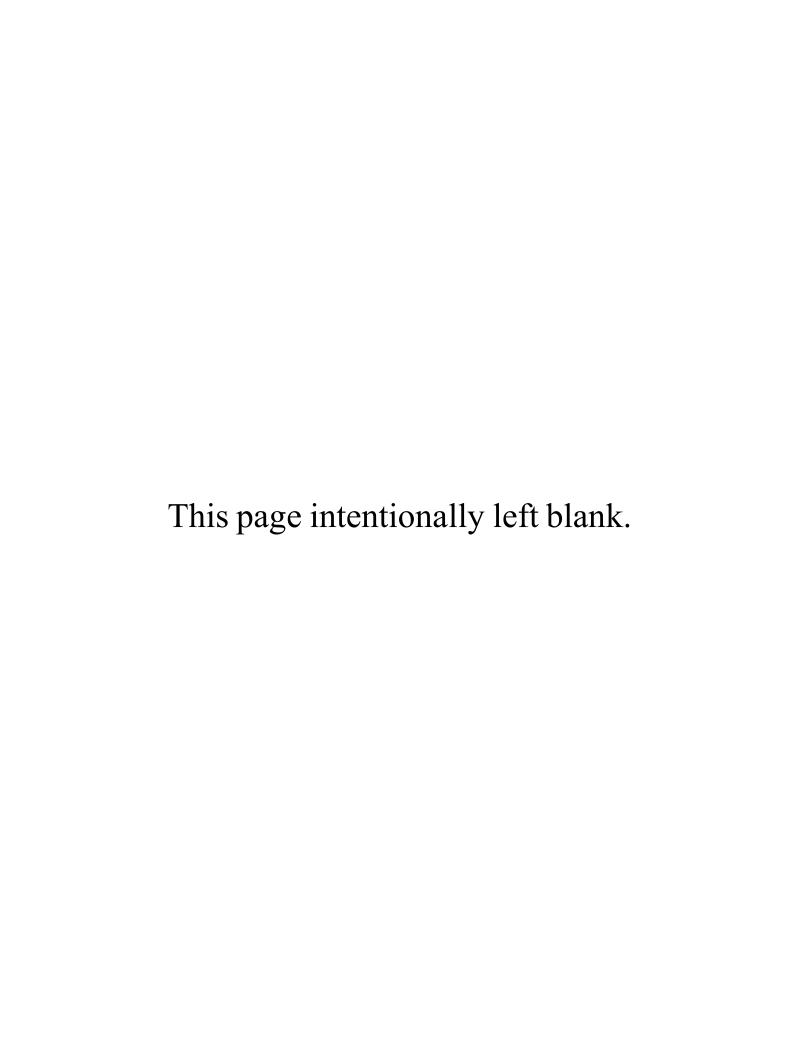
# Exhibit G





Date:

October 28, 2024

Project No .:

1539-1-1

Prepared For:

Matthew Francois

RUTAN AND TUCKER, LLP 455 Market Street, Suite 1870 San Francisco, California 94105

Re:

Geotechnical/Geologic Peer Review

226 Highway 1 Carmel, California

Dear Mr. Francois:

## Introduction and Background

As requested, we present the results of our peer review for the geologic and geotechnical investigation reports and other aspects of the above-referenced project. Our certified engineering geologist and geotechnical engineer visited the site on October 10, 2024 to review site conditions and potential geologic and geotechnical hazards.

The documents reviewed include the following:

- A geologic feasibility assessment titled, "Geologic Feasibility Assessment for Coastal Property at 244 #3 Highway 1, Carmel Highlands, California, Monterey County APN 241-182-003," prepared by Easton Geology, Inc. for Terry Tydings, Job No. C20006, dated 17 August 2020.
- A geologic investigation titled, "Geologic Investigation, Johnson Property, 226 Highway 1, Carmel, California, Monterey County APN 241-182-003-000," prepared by Easton Geology, Inc. for Hal and Allison Johnson, Job No. C21019, dated 15 December 2022.
- A preliminary geotechnical investigation titled, "Preliminary Geotechnical Investigation, Coastal Bluff Retreat Analysis, 244 #3 Highway 1, Carmel, California," prepared by Rock Solid Engineering, Inc. for Terry Huntington Tydings, Project No. 20020, dated August 14, 2020.
- A geotechnical investigation titled "Geotechnical Investigation, Proposed Single Family Residence, 226 Highway 1 (Previously 244 #3 Highway 1), Carmel, California, APN: 241-182-003-000," prepare by Rock Solid Engineering, Inc. for Hal and Allison Johnson, Project No. 20020B, dated December 15, 2022.
- A set of architectural plans, Sheets A-0.1, Topographic Survey, A-1.1, A-1.2, A-1.2B, A-1.3, A-2.1, A-2.2, A-2.3, A-3.1, A-3.2, A-7.1, A-7.2, titled, "Johnson Residence, 226 Highway 1, Carmel, California, 93923," prepared by Eric Miller Architects, Inc., dated June 28, 2024.



 A set of civil sheets, Sheets C3 and C4, titled, "Grading Drainage, & Erosion Control Plan," prepared by Landset Engineers, Inc., dated June 2024.

#### Project Description

A single-family residence with an attached garage is planned on a flag lot situated on a steep granitic bluff between Highway 1 and the Pacific Ocean. The lot has previously had some minor grading to form a small, relatively level cut-fill building pad. The property is constrained by a steep, bedrock slope to the east, adjacent to Highway 1, a residential property to the south, a very steep bluff above a small cove to the west, and a vista point and steep coastal bluffs to the north.

## Scope of Services

Our scope of services was presented in our agreement dated September 17, 2024, and includes a review of available information in our files and published documents, historical aerial photo review, site reconnaissance, review of the geologic and geotechnical investigations referenced above, identification of potential geologic, seismic and geotechnical impacts, drafting and report preparation. We also provided drone services to allow for observation of inaccessible vantage points.

#### General Information

In general, both the Easton Geology, Inc. (Easton) and Rock Solid Engineering, Inc. (Rock Solid) reports were prepared in an iterative and collaborative manner to describe the site. Background research of published reports, maps, and aerial photographs was conducted. Geologic mapping during the feasibility phase and final geologic investigative phases was done. Subsurface exploration via indirect (seismic refraction) and direct (hand augers, drilled borings and shafts) methods performed for the project are typically used for site characterization. Analysis of fault data from government and research sources (Petersen et al, WGCEP and California PHSA) and attenuation relationship models by PEER were used in seismic hazard analysis.

## **Exploration Methods**

## Geologic Mapping

Easton conducted geologic mapping of the site initially for the 2020 Easton geologic feasibility report. The surficial geologic mapping was plotted on large scale (1-inch = 1 foot) map sheet overlain on a basemap with a 1-foot contour interval prepared by Rasmussen Land Survey dated 2020. This Site Geologic Map is provided as Plate 1 of the 2020 report and identified the presence of three main geologic units on the site including fill (map symbol af), talus (Qt), and porphyritic granodiorite (Kgdp).

Later geologic mapping, depicted in Plate 1 of the 2022 Easton geologic investigation report identified two additional geologic units on the site including marine terrace deposits (Qcl) and old alluvium (Qoal). This later map expanded the extent of the fill and showed older alluvium in the autocourt area based on aerial photo interpretation. In addition, the map benefitted from data derived from later subsurface shaft excavations and seismic refraction surveys as shown on the newer map.



The 2022 geologic map shows a dashed line labeled as "top of bluff" which varied from Elevation 43.52 to 61.05 feet. Another dashed line labeled "estimated position of 100-year blufftop" is situated coincident with the western boundary of the estimated feasible building envelope from the Easton (2020) report and extends beyond to northwest and southeast.

The geologic mapping indicates various long and narrow fill and cut slopes presumably (according to the text) from early site grading from the 1960's as well as grading by Caltrans possibly as early as the 1930s. The site fill occupies two elongated lobes, which extend from Elevation 86 feet down to 75 feet, and is assumed to be undocumented, non-engineered soil. Some notes on the map indicate "thin sidecast fill," however the borings indicate between 1 and 3 ft in thickness at other locations. Outside of the eastern property line boundary, the Caltrans fill extends from the property boundary upslope at about a 2:1 (H:V) inclination to the edge of Highway and portions may be engineered. A culvert enters the site with no mapped drainage catchment from the Caltrans ROW near the intersection of the guardrail and wall.

Talus deposits are shown as a long, narrow geologic unit at the base of shallow cut slope within the building envelope. The map only indicates this as a recent unit and it is not described in the text with respect to its thickness or consistency. It is assumed to represent deposits that have accumulated from the raveling of the cut slope.

Marine terrace deposits are shown occupying the extreme southwest corner of the property, both above and below the top of the existing bluff. The geomorphology of the marine terraces are discussed in the text. Slightly older than the marine terraces is the old alluvium, which was mapped in two locations on the site geologic map based on an evaluation of air photos. Both of these locations lie within what Easton refers to as colluviated swales. One is an elongated surficial unit trending west and underlying the proposed autocourt. This unit is described as a sandy clay conglomerate in Shaft #1 and #3 where it was encountered. The other location is at the extreme northern boundary of the site and trends to the northwest as it extends beyond the site boundary. Both of these units have a queried geologic contact line, indicating uncertainty. Because of this, the contact lines extend either over the underlying bedrock in the northern location or under the overlying fill in the southwestern location.

Bedrock is shown occupying the steepest slopes just above the cove and then is exposed elsewhere on the site either in cut slope exposures or in outcrop. It is described as a porphyritic granodiorite on the 2020 site geologic map but the 2022 map removes the descriptor and labels it as granodiorite. The boring logs refer to the bedrock as quartz diorite. Structural attitude measurements (13) of bedrock joints are shown on the steep slopes below the top of bluff, along the margins of an arcuate scarp located at the northwest corner of the proposed deck and in outcrop or cut slopes within or adjacent to the feasible building envelope.

#### Seismic Refraction Surveys

Norcal Geophysical (Norcal) performed three seismic refraction lines on the site in the fall of 2022 along transects designated as SR-1, SR-2 and SR-3. Transects SR-1 and SR-2 generally followed topographic contour both through (SR-1) or just downslope (SR-2) of the feasible building envelope. SR-3 crosses the other two near the envelope and then extends downslope oblique to contour interval to a location offsite near the saddle. The seismic survey processing and interpretation benefitted from borehole data done previously that allowed for some correlation.



Norcal interpreted a relatively thick, low to medium P-wave (Vp) velocity zone in the SR-1, SR-2 and northeastern end of SR-3 transects below 5000 feet per second (fps) indicative of deeply to moderately weathered bedrock. The velocity increased with depth, presumably due to the low degree of weathering. This velocity zone thickened considerably (>25ft) in the downslope (SW) end of SR-3 as it approached the saddle.

#### Shaft Logging

Four hand-dug exploratory shafts were excavated at locations near the retaining wall proposed for the autocourt or adjacent to the building envelope. One (Shaft 4) was excavated adjacent to Boring B-4 to allow correlation of earth materials. The shafts allowed for direct observation of earth material contacts and geometries that could be missed in borings if not continually logged. The shaft logs describe all five lithologies shown on the geologic map and describe in relative detail the degrees of weathering, inclination of contact, shape and infilling of bedrock joints, and clast/matrix support relationships.

The shafts extended to depths as shallow as 9.25 feet (Shaft 2) and as deep as 12.5 feet (Shafts 1 and 3). Because they were hand excavated, they were limited to the weathering zone. There was a relatively sparse amount of bedrock joint attitudes measurements.

#### Borehole Logging

Four exploratory borings were drilled on the site using a track-mounted, solid-flight auger drilling rig, equipped with a Terzaghi split spoon sampler and either a 2-inch or 2.5-inch sampling capability. It seems that the borings were logged by both Easton Geology (GFE) and by Rock Solid (YW), as they are presented on different log templates. Of note, the Rock Solid borings describes refusal in "unweathered bedrock" at depths of between 10 and 18 feet, whereas the Easton borings described weathered granodiorite or sampler refusal. Easton describes colluvium at shallow depths consisting of sand with silt or sand with clay, which was not noted on the geologic mapping.

Two hand auger borings were drilled and logged by Rock Solid (JDB/GE) down to top of refusal on bedrock at less than a 5-foot depth.

#### Discussion

Several conclusions were drawn from the data collected using analysis common to standard of practice in engineering geology and geotechnical engineering. What follows is a discussion on the methodology used to develop these conclusions for various project components.

The Easton Feasibility Report (2020) was prepared to develop a geologically feasible building envelope and to establish a projected bluff setback line. The later Geologic Investigation (2022) provided more background on seismic sources and analysis.

### Establishment of Seismic Inputs for Slope Stability Analysis

Easton in their feasibility report (2020) developed 3 geologic cross-sections and deterministically derived seismic shaking data and seismic coefficient (k) for use in slope stability analysis by Rock Solid. Easton considered triggering earthquake scenarios using the San Andreas and San Gregorio faults. The k value of 0.56 was based on ground acceleration of 0.85g generated from a Mw 7.3 earthquake event on the San Gregorio Fault, coupled with a



bluff height of 86 feet and estimated failure thickness of 34 feet. Their calculation also considered topographic amplification on slopes of approximately 45 degrees. The last input was the depiction of a geologically feasible building envelope shown on Plate 1 of that report. From this analysis, Easton reported that the Rock Solid slope stability analysis (2020) found the envelope to be both statically and seismically stable. Presumably from this analysis, the term "stable" reflects a factor of safety of 1.5 and 1.0 or higher for shallow rotational failure (block failure was not addressed) for static and seismic condition, respectively, and the project building limit was extended as much as 40 feet further seaward of the building envelope, as shown in later site plans by both Easton and Rock Solid.

The 2020 Geologic Investigation provided additional descriptions of how the seismic accelerations were derived and provided the results in Table 2 below. Easton did not perform in-situ measurement (e.g. shear wave velocities) or a site-specific response evaluation as part of their ground motion analysis.

TABLE 2 Faults, Earthquakes and Deterministic Seismic Shaking Data						
Fault Segment(s)	Moment Magnitude of Characteristic or Maximum Earthquake (Ma)	Estimated Recurrence Interval (years)	Site Soil Classification	Dictance 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	52.5	0.12	0.22
Monterey Bay - Tularcito:	7.1	2,800		11.1	0.29	0.52
San Gregorio-Hosgri (Sur segment)	7.0	400		4.6	0.45	0.80

#### **Determination of Bluff Setback Line**

Easton characterized a "Projected 100-year Bluff Profile" of the steep slopes using geologic mapping and an assumption of a less than 1 foot per 10 year bluff retreat rate. It would appear that this rate is from a published reference (Scripps Institute of Oceanography, 2022) that does not provide a long-term data set that supports a higher or lower rate. Where the "Projected 100-year Bluff Profile" intersects the existing top of bluff represents where the bluff will be after 100 years and also forms the most seaward boundary of the envelope.

Easton provides schematic intersecting joint lines on all of the cross-sections, which presumably show the three primary joint sets. When measured along the axis of the cross-section they indicate apparent dips of 90° vertical, 35° East and 35° West. There is no discussion on these apparent dips, whether they represent the 3 joint sets measured at the face and how they were used to calculate the "Projected 100-year Bluff Profile". The only discussion of geologic structure is the following from the 2022 Geologic Investigation report. "The granodiorite underlying the subject site is highly jointed, with a dominant, steep, bluff parallel joint set controlling the orientation of the bluff face. Joint spacings were typically 6 to 12 inches apart in exposures we measured."



## Slope Instability

Easton did address granodiorite stability in the following statement: "The highly jointed granitic bedrock underlying the subject area, however, may be prone to relatively shallow translational sliding where weak, adversely dipping joints or shears daylight on the slope, but again, we saw no evidence during our surface and subsurface investigation to support that a landslide potential exists within the less weathered granodiorite at depth. The overall configuration of the bedrock bluff is controlled by a dominant joint set trending parallel to the cove, and retreat typically results through wave action undercutting and intersecting a steeply dipping, bluff parallel joint surface"

These statements are qualitative and are not supported directly by kinematic analysis such as stereonet evaluations to determine weighting of contributing joint sets, orientation and methods of failure (toppling, wedge or planar).

#### Conclusions

The Easton Report (2022) has several conclusions, that include the following key statements:

- "The primary geologic concerns for the site are slope stability, long-term coastal erosion, and seismic shaking".
- "Notwithstanding the inherent weaknesses and discontinuities in the areal bedrock, the granodiorite is strong and very erosion resistant. Our subsurface exploration and field reconnaissance determined that the proposed development area is underlain by surficial fill, colluvium and highly weathered granodiorite that becomes stronger and less weathered with depth. Planes of weakness such as joints, shears and inactive faults control the overall configuration of the very slowly retreating bluff face."
- "The very steep bluff-face below the proposed development area 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."

The Rock Solid report (2022) has several general conclusions, that include the following key statements:

- "Based on the results of our investigation, it is our opinion that from the geotechnical standpoint, the subject site will be suitable for the proposed development provided the recommendations presented herein and in the Geologic Investigation are implemented during grading and construction."
- "Based on our discussions with the design build contractor, the proposed residence and GRS walls will be supported on a foundation system composed of micropiles.
   Recommendations for this foundation system are provided in Section 5.3, Foundations."



- "The residence will be set into the slope with the lower level retained on the east side and daylighting to grade on the west side. Retaining walls that are integral with the residence are addressed in Section 5.5.2."
- "The project will require fill at the proposed auto-court to reach design grades. The fill wall is anticipated to be a geosythetically reinforced soil (GRS) wall. Recommendations for GRS walls are presented in Section 5.5.3."
- "The project will also include retaining walls for the cut on the northeast side of the parcel. Due to the depth of the required cuts at or near the property lines, the cut wall is anticipated to be supported by rock bolts. Recommendations for cut walls are presented in Section 5.5.4."
- "Existing fill was encountered on the west side of the existing graded pad. The fill appears to be native soil that was excavated from the east side of the graded pad. The fill is loose and appears to have been placed without engineering control. The fill should not be counted on for support of structure or improvements."

Our comments and critiques of the conclusions reached by these reports are noted below.

- Easton does not adequately characterize three geologic features which appear to represent either active or potentially active landslides, as summarized below.
  - a. A deposit of Qoal is located beneath the proposed autocourt and also downslope of the southeastern end of the proposed residence as shown on the Easton geologic map. This elongated deposit appears to occupy a sloping swale surface that steepens towards the face of the slope as shown in geologic cross-section D-D.' It would appear that this deposit might be a landslide. The unsupported toe of this deposit is shown as Feature "A" in the attached photo.
  - b. Along the bottom of the steep slope is an exposure in the granodiorite that shows the intersection of 3 primary joint sets. At this location is a feature that appears to be a potential wedge failure with green moss indicative of seepage (see Feature "B" in the attached photo). Other areas, and potentially those covered by vegetation are indicative of potentially similar rock failure conditions.
  - c. The geologic map shows a headscarp near the northwest corner of the residence deck. The map indicates an 8' vertical joint-bounded scarp at this location with 5 joint attitudes showing random strikes and moderate to steep dips of between 52° and 81° in the granodiorite. Given the other observed joint sets in cliff exposure during our reconnaissance, this scarp (Feature "C" in the attached photo) represents an active slope instability condition.
- 2. Easton needs to describe in detail how the base of the "Projected 100-year Bluff Profile" was chosen for the initial 3 cross-sections in the Feasibility Report and the final 5 cross-sections in the Easton Geologic Report. Specifically, describe the basis for the lowermost beginning point and the angle of projection towards the top of bluff of the line. Also explain how this appears to be the same geometry on all 5 profiles, given the presence of a bedrock scarp in A-A', deposits of Qoal on the face of D-D', and a pocket of Qcl in E-E'.



- 3. Easton needs to provide more discussion and defense of their initial position whereby development seaward of the "geologically feasible building envelope" must not rely on support from material above the projected bluff profile (as depicted on the cross-sections in the 2020 Feasibility Report) yet later development is allowed seaward of the envelope based exclusively on acceptance via a Factor of Safety of 1.0 in the worst case. Justifying this shifting of the allowable development seaward strictly because of retaining wall and foundation elements being embedded into the underlying competent bedrock is not warranted and conflicts with Monterey County guidance on allowable building on slopes exceeding 30°.
- 4. Easton needs to describe why a kinematic analysis was not performed on this project. Structural attitudes were measured from cut slopes and outcrops at various locations in the study area. While recognizing that access to measurement points is limited due to the steepness of the slopes, there are other methods for obtaining bedrock joints and shears. These include terrestrial LiDAR to develop point clouds as well as line surveys along the face of the toe of slope from a boat or kayak.

Relying entirely on surface measurements does not account for anisotropic variability. Therefore, obtaining structural measurements from boreholes is also needed to complement the surface surveys. Downhole televiewer methods (video or acoustic) allow for collection of data with depth. Both methods can provide useful structural data to be used in kinematic analysis that can show the types of failure that may occur on the project site. Easton described in the 2022 Geologic Report that due to access limitations hand dug shafts were substituted for drill holes along the autocourt retaining wall. These shafts only penetrated weathered bedrock and do not provide nearly enough structural data of less weathered bedrock to conduct the required analysis. Based on our reconnaissance, other portions of the site close to the setback line could be accessed by track mounted drill rigs capable of advancing wireline diamond coring tools with accompanying downhole televiewer tools. Should future rock coring be utilized on this site, there needs to be consistency on the borehole logs with respect to the degree of bedrock weathering.

- 5. Slope stability analysis was performed previously by Rock Solid (2020) in their Preliminary Geotechnical Investigation report. The results of this analysis were referenced in their final geotechnical report, but not modified. The slope stability analysis performed included analysis of potential rotational failures in the soils and weathered granite above the fresher granite at depth. While it seems worthwhile to check this potential failure mechanism, it does not appear to be the primary mechanism for instability of the bluff. As described in the corresponding geologic report (Easton, 2022), "Planes of weakness such as joints, shears, and inactive faults control the overall configuration of the very slowly retreating bluff-face." In our opinion, it would be important to the design of the foundation to analyze this potential failure mechanism (i.e. block failure along joints) to further understand what forces may act on a "seaward" pile foundation extending to below the projected 100-year bluff profile line. These forces may exceed those recommended for design (see Comment 6 below).
- 6. For design of micropiles (to be designed by others), Rock Solid has recommended an active earth pressure of 30 psf/ft, acting on a plane which is 1½ times the shaft diameter. Active earth pressures assume that a pile is free to deflect to achieve active earth pressures. However, the micropiles will likely be designed to resist lateral movement (i.e. with battered piles) and be relatively stiff, as well as restrained at the base of the residence. Therefore, it seems likely that the planned micropiles should be designed (at a minimum [see Comment 7]), for earth pressures closer to at-rest earth pressures. Earth pressures should be

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considered over up to 3 pile diameters based on materials, micropile spacing, geometry, and other factors.

- 7. Once design forces on a potential micropile foundation is determined, a design-builder should also consider potential deflections of the structure, static and seismic, in their analysis. Most testing has shown that micropiles provide little lateral resistance in bending, and the lateral forces should be resisted by tensile and compressive axial forces in varying battered piles. The consideration of these factors and potential increased forces in design based on further kinematic and slope stability analysis, may likely make micropiles infeasible.
- 8. Rock bolts are to be designed to retain significant cuts into the granitic slope near the property line. It is recognized in the geotechnical report that an easement will be required where rock bolts will extend onto Caltrans right-of-way. In addition, walls along the east side of the property, or the east side of the easement to the property, where a failure could potentially affect Caltrans property or facilities, will likely have to be submitted to Caltrans for review prior to approval. Further, any drainage culverts including the one previously mentioned entering the property from the upslope area will need to have adequate catchment and disposal away from the building areas.
- For seismic earth pressures, Rock Solid recommended a resultant acting at 0.6H above the base of the wall. Current research shows that a resultant acting at 0.33H is more representative of the location of the resultant of seismic earth pressures (Lew, M., Sitar, N., Al-Atik, L., Pourzanjani, M., and Hudson, M. B. [2010]).
- 10. The geotechnical report indicates that development west (i.e. seaward) of the 100-year blufftop will require deep foundations. However, it is unclear if deep foundations are required for the entire foundation system in this case. The report also mentions both slabs-on-grade and structural slabs supported by micropiles for the residence. Again, it is unclear what the final intent is. In our opinion, it would be prudent to uniformly support the residence on one foundation system type, and one slab system, or that it be further explained in the report. In our opinion, it does not seem prudent to have half the residence pile supported with structural slabs, and half with a different foundation system with slab-on-grade floors.

#### Closure

This review of reports and plans has been prepared for the sole use of Rutan and Tucker, LLP in accordance with generally accepted geotechnical engineering principles and practices in the San Francisco Bay Area at this time. No warranties are either expressed or implied.



Should you have any questions, or if we may be of further service, please contact us at your convenience.

Sincerely,

Cornerstone Earth Group, Inc.

Erin L. Steiner, P.E., G.E. Senior Principal Engineer

William Almini

William H. Godwin, CEG Senior Engineering Geologist

ELS:WHG:CBB

Copies: Addressee (1 by email)

Attachments: Photographs (Feature A through Feature C)



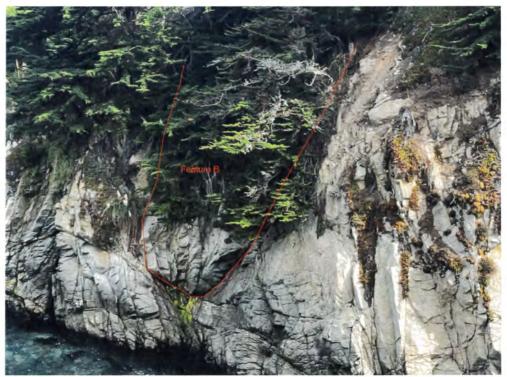




Photographs



Feature A – A deposit of Qoal.



Feature B – Potential Wedge Failure.





Feature C – Location of headscarp.

