CALIFORNIA COASTAL COMMISSION
NORTH CENTRAL COAST DISTRICT
45 FREMONT STREET, SUITE 2000
SAN FRANCISCO, CA 94105-2219
PHONE: (415) 904-5200
FAX: (415) 904-5400
WEB: WWW.COASTAL.CA.GOV

F8a

A-2-SMC-19-0002 (Zubieta SFD)

August 14, 2020

CORRESPONDENCE

From:	carlos cz-a.net
To:	Martinez, Erik@Coastal
Cc:	Street, Joseph@Coastal; Rexing, Stephanie@Coastal; Pfeifer, Sara@Coastal; John Franklin; dskelly@geosoilsinc.com; Tatiana Barhar
Subject:	199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.
Date:	Monday, May 4, 2020 12:46:35 PM
Attachments:	Zubieta S7653.1 4-28-20 (fnl).pdf

Hello Mr. Martinez,

I hope this finds you healthy and well during these difficult times.

Attached you will find the "Supplentat Analysis of Coastal Bluff Retreat" establishing the foundation set back as determined by Dr. Joseph Street of the California Coastal Commission and John P. Franklin of Geosoils Inc.

We are very excited and eager to move forwards with the project and to work on revising the proposed house plans. Please provide us with a timeline outlining CCC staff approval process and moving forwards to the CCC final determination.

Thank you for your timely input, and let us know if you have any questions.

Carlos Zubieta Architect

CZA

www.cz-a.net

From:	Martinez, Erik@Coastal
To:	carlos cz-a.net
Cc:	Street, Joseph@Coastal; Rexing, Stephanie@Coastal; Pfeifer, Sara@Coastal; John Franklin; dskelly@geosoilsinc.com; Tatiana Barhar
Subject:	RE: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.
Date:	Friday, July 3, 2020 9:29:00 AM
Attachments:	image002.png image003.png

Hi Carlos,

Yes, the meeting in August will be a virtual meeting hosted on Zoom which you can join using a computer or by phone.

-Erik

From: carlos cz-a.net <carlos@cz-a.net>
Sent: Thursday, July 2, 2020 11:18 AM
To: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: Re: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Hello Erick,

It is unfortunate you are making the call to only consider the 1.5 safety factor and not the 1.3 as discussed during our phone call. We have taken all the precautions and necessary measures to provide additional data requested by CCC and have substantive evidence in our geologist's report and studies that our proposed project will work under the 1.3 safety factor.

Since California is still trying to figure out how to manage the spread of Covid I assume the hearing in August 12-14 will be virtual. Could you confirm please? I need to know because this time may conflict with my plans to drive my daughter to her first year of college.

My intention is to make myself available for this meeting, please advise.

Thank you and happy fourth of July.

Carlos Zubieta

www.cz-a.net

From: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Sent: Thursday, July 2, 2020 10:56 AM
To: carlos cz-a.net <carlos@cz-a.net>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com <dskelly@geosoilsinc.com>; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: RE: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Hi Carlos,

Thank you for reaching out. Our technical experts are still reviewing the details of the supplemental analysis, however we are still planning to use the 1.5 factor of safety setback, as it is a Coastal Commission standard. Once our analysis is done, I'll will reach out to let you know.

That being said, we are looking to schedule this item for the upcoming August hearing. Does August work for you? Happy to discuss or answer any questions.

-Erik

From: carlos cz-a.net <carlos@cz-a.net>
Sent: Tuesday, June 30, 2020 11:16 AM
To: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: Re: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Good morning Mr. Martinez.

On June 4th I reached out to inquire about the status of our supplemental slope analysis review for 199 Arbor Lane. You mentioned in your email that you may need a couple of more weeks to finalize your review.

Could you give as an update on the status of your review and when we can expect CCC's determination?

Thank you,

Carlos Zubieta

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From: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Sent: Thursday, June 4, 2020 1:48 PM
To: carlos cz-a.net <carlos@cz-a.net>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com <dskelly@geosoilsinc.com>; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: RE: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Hi Carlos,

Thanks for reaching out. Hope things are good with you as well.

We are still reviewing the supplemental analysis you provided and are working through the questions with our technical staff. We should be getting back to you in the next couple of weeks. I'll keep you posted as we work through our analysis.

-Erik

From: carlos cz-a.net <carlos@cz-a.net>
Sent: Tuesday, June 2, 2020 4:52 PM
To: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: Re: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Hello Erick,

I hope all is well with you.

I am curious to know where we are in the process, please let me know when we can expect CCC reponse to our proposal.

Thank you,

Carlos Zubieta

CZA

www.cz-a.net

From: carlos cz-a.net <carlos@cz-a.net>
Sent: Tuesday, May 5, 2020 10:43 AM
To: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com <dskelly@geosoilsinc.com>; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: Re: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Sounds good, thank you.

CZA

www.cz-a.net

From: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Sent: Monday, May 4, 2020 1:01 PM
To: carlos cz-a.net <carlos@cz-a.net>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com <dskelly@geosoilsinc.com>; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: RE: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

Thanks, Carlos. We will review and get back to you as soon as possible.

Best,

Erik

From: carlos cz-a.net <carlos@cz-a.net>
Sent: Monday, May 4, 2020 12:46 PM
To: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
Cc: Street, Joseph@Coastal <Joseph.Street@coastal.ca.gov>; Rexing, Stephanie@Coastal <Stephanie.Rexing@coastal.ca.gov>; Pfeifer, Sara@Coastal <Sara.Pfeifer@coastal.ca.gov>; John Franklin <jfranklin@geosoilsinc.com>; dskelly@geosoilsinc.com; Tatiana Barhar <tatiana@verdegodesign.com>
Subject: 199 Arbor Lane CCC Appeal No. (A-2-SMC-19-0002) Supplemental Analysis for foundation set back.

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Thank you for your timely input, and let us know if you have any questions.

Carlos Zubieta Architect

CZA

www.cz-a.net

From: Lennie Roberts
To: Martinez, Erik@Coastal
Subject: Re: 199 Arbor Lane
Date: Wednesday, May 27, 2020 11:01:20 AM

Hi Erik,

One other item; In the first paragraph of CCC Staff Geologist's April 6, 2020 Analysis, he refers to a letter from GeoSoils dated January 6, 2020, "The 1/6/2020 letter updated the setback analysis to account for the bluff edge retreat that has occurred since 2016.

Would it be possible to get a copy of this letter?

Thanks!

Lennie

> On May 26, 2020, at 2:51 PM, Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov> wrote:
>
> No problem. Let me touch base with our geologist about that and get back to you.
>
> Hope you have a great weekend.
>
> -Erik
>
> -----Original Message-----
> From: Lennie Roberts <lennieroberts339@gmail.com>
> Sent: Tuesday, May 26, 2020 1:40 PM
> To: Martinez, Erik@Coastal <erik.martinez@coastal.ca.gov>
> Subject: 199 Arbor Lane
>
> Hi Eric, Thanks for sending me the coastal staff's setback analysis for 199 Arbor Avenue (on May 18).
>
> I am wondering why the analysis did not also include methodology and conclusions by ESA in 2016 for the Vallemar Bluffs project, just north of the subject property.
>
> Best,
>
> Lennie

From:	Lennie Roberts
To:	Martinez, Erik@Coastal
Cc:	Louis White
Subject:	199 Arbor Lane - ESA Review of Coastal Bluff Erosion and Study
Date:	Thursday, May 28, 2020 2:08:53 PM
Attachments:	ESA - Arbor Lane Coastal Erosion - 2020-05-27.pdf

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Hi Erik,

Attached is the Review and Recommendations by Louis White of ESA re: coastal bluff erosion studies that have been prepared for the proposed single family residence at 199 Arbor Lane in Moss Beach.

ESA has undertaken this review for Green Foothills, which is the Appellant of a Coastal Development Permit issued by San Mateo County for the single family residence. ESA has noted that the three studies that were available may only be a partial amount of the work that has been completed for the project.

We hope this is helpful to Commission staff in your evaluation of the bluff erosion issues that are the basis of our Appeal.

Please feel free to call me if you have any questions.

Best,

Lennie Roberts, Legislative Advocate
Green Foothills
650-854-0449

550 Kearny Street
Suite 800
San Francisco, CA 94108
415.896.5900 phone
415.896.0332 fax

esassoc.com

memorandum

date	May 27, 2020
to	Lennie Roberts (Green Foothills)
from	Louis White, PE
subject	Arbor Lane Coastal Bluff Erosion Review and Study (ESA Ref. #D191384.00)

Introduction

Per request of the Green Foothills, ESA reviewed existing studies related to coastal and bluff erosion that were prepared for a proposed residential development at 199 Arbor Lane in Moss Beach, California. This memo presents a summary of ESA's review of the relevant studies and recommendations for consideration.

Background

A coastal development project is proposed on an undeveloped bluff top location at 199 Arbor Lane, Moss Beach, California. The project design, environmental review, and permitting was based on geotechnical and geological evaluations by Michelucci & Associates, Inc. (MAI) in 2016 and updated in 2017, which assessed geologic conditions at the site but did not evaluate the effects of sea-level rise on bluff retreat rates. A third-party assessment of coastal bluff erosion was conducted by GeoSoils, Inc. (GSI) in July 2019, which estimated future bluff retreat with sea-level rise. Green Foothills has requested that ESA conduct a review of the technical reporting related to coastal hazards, including flooding and erosion, and to offer additional recommendations if needed.

Consultants retained by the developer prepared geotechnical and coastal erosion studies between 2016 and 2019 to inform design and permitting of the proposed project. The key studies include following:

- Michelucci & Associates, Inc. (MAI 2016) – a geotechnical and geologic investigation of the site, including estimates of bluff erosion rates, site geology, recommendations for design. This study provides a basis for the historic erosion rate that was used by subsequent studies.

- Michelucci & Associates, Inc. (MAI 2017) – an update to the 2016 geotechnical and geologic investigation that describes bluff erosion on the order of 10 feet but asserts that the previously computed historic erosion rates are unchanged.

- GeoSoils, Inc. (GSI 2019) – a third-party coastal bluff retreat and slope stability evaluation that presents approximate projected bluff erosion distances at the end of a 50-year period with sea-level rise.

ESA understands that these three studies represent only a partial amount of the work that has been completed for the project, and that discussion between the project design team, permitting agencies, and other stakeholders are ongoing.

Purpose

The purpose of this memorandum is to provide Green Foothills with ESA's comments on the technical analyses used by MAI (2016 & 2017) and GSI (2019) to assess the proximity of the proposed development to projected bluff erosion hazards in the future with sea-level rise.

Scope

ESA completed the following scope of work for the project per our contract with Green Foothills:

1. Site Reconnaissance: ESA staff visited the site to conduct a reconnaissance-level survey of the site, including visual observations of the bluff top and beach. ESA's observations and photographs were used to inform the review of the relevant studies.

2. Review & Comment of Relevant Studies: ESA reviewed the relevant studies that were prepared for the proposed residential development project at the site, with a focus on the Coastal Bluff Retreat and Slope Stability Evaluation by GSI (2019), as well as two earlier geotechnical and geologic reports by MAI (2016; 2017). ESA focused the review on the methods used by MAI and GSI to assess the future geomorphic conditions resulting from sea-level rise.

3. Supplemental Calculations: ESA performed supplemental calculations to help inform recommendations to refine and assess the risk of the site to coastal flooding and erosion hazards for existing and future conditions with sea-level rise.

Site Observations

ESA staff visited the site at approximately 1:00 PM on December 23, 2019 during a clear and calm day. The tidal conditions were low, with the intertidal reef exposed in front of the project site. The tide elevation was approximately 0.5 feet NAVD according to NOAA predicted tide at Pillar Point Harbor (NOAA Sta. 9414131). The proposed development is located on a small bluff top area that is bounded by a creek drainage to the south and an actively eroding coastal bluff to the west (Figure 1). Areas of active and recent bluff erosion were evident, and talus piles appear to be from the bluff and feed sand to the beach (Figure 2). The site is located adjacent to the Fitzgerald Marine Reserve, which includes an extensive intertidal reef that extends from the beach through the surf zone. This specific reef is locally known as Horseshoe Reef (Morrall 2010). The shore is characterized by alternating reaches of unarmored bluff and large coastal armor structures.

Source: ESA

Figure 1
Panoramic photo of proposed residential development looking south:
Creek drainage behind trees, eroding bluff along western edge of site, and offshore reef

Source: ESA

Figure 2
Photo of the coastal bluff at west side of project site:
Indications of recent and active erosion

In contrast to unarmored reaches of shore that have a beach present, armored reaches of shore adjacent to the site have beaches that are very narrow or not present at all. The unarmored reaches of shore in between existing armor structures are located much further landward than armored shores, and show signs of active and ongoing erosion. Our opinion is that the armoring on the adjacent shores reduces the sand supply and increases the erosion of the unarmored parcels. Also, it appears that bluff erosion helps to maintain a beach fronting the bluff.

The beach comprises a mix of boulders, cobbles, and covered with a relatively thin layer of sand, similar to other beaches in the area (see ESA 2016). In the intertidal zone, the reef formations appear to be composed of a

mudstone that is persistent, although not entirely erosion resistant. The existing reef extending from the beach through the nearshore zone dissipates wave energy and limits the maximum depth-limited wave height that can directly impact the bluff. With sea-level rise, the depths over the reef will increase and therefore we expect the depth-limited wave heights will increase and wave exposure to the bluff. As the amount of wave action incident to the bluff increases, the bluff erosion rates will increase also.

Assessment of GSI (2019) Study on Coastal Erosion

The GSI (2019) study of projected bluff erosion over the selected design life of the project appears to yield a conservatively low bluff recession estimate that is based on parameters likely to result in lower recession values. The primary parameters used in the selected analysis method include the following list, for which we have provided some discussion and recommendation on additional calculations to explore the sensitivity of the results.

- **Historic erosion rate of 0.78 feet per year**
  The erosion rate of 0.78 feet per year (fpy) was based on the value selected by MAI (2016). However, this value of 0.78 fpy was selected without applying a rigorous and standard methodology of calculation of erosion rates, and was included in a set of values computed by MAI or others, with ranges up to 1.25 fpy. We note that MAI computed values as high as 0.96 fpy at one of the transects at the project site, suggesting that a value of about one fpy would be a reasonable value to check.

- **Historic sea-level rise rate of 0.006595 feet per year, cited as the average over a 110 year period at the San Francisco tide gauge**
  The NOAA published value of the relative sea-level rise trend at the San Francisco tide gauge is 1.99 mm per year, equivalent to 0.006529 feet per year. Although only slightly lower (0.006595 - 0.006529 = 0.000066), this difference propagates through the calculations and yields bluff recession results that are slightly greater than those reported by GSI. However, we think this discrepancy is of small consequence relative to the effect of other values selected by GSI.

- **"Future" sea-level rise rate of 0.072 feet per year computed using the simplified formulation of the SCAPE model and implications on projected erosion rate**
  The description of this value as a future condition is an interpretation that we believe to be erroneous: really, it is an *average* rate of sea-level rise between present day and year 2069. Due to the acceleration of sea-level rise, the future rate would exceed the average value over the planning horizon, and therefore the subsequent calculations of average erosion rate over the planning horizon should use this value of sea-level rise rate equal to 0.072 fpy or similar. GSI's application of the simplified SCAPE equation deferred this calculated average erosion rate to the final 13 years of the planning horizon, which yields an equivalent rate of sea-level rise of 0.033 fpy over the 50-year planning horizon. By inspection, this yields a much lower amount of sea-level rise as compared to the State Guidance, which projects approximately 3.5 feet of sea-level rise by 2070 under the medium-high risk aversion scenario (OPC 2018; CCC 2018). Therefore, we disagree with the approach taken to split the planning horizon into two periods, where the first 37 years used an arbitrary selection of erosion rate (1.09 fpy) and the last 13 years used the rate of 1.72 fpy computed using the average sea-level rise rate over the planning horizon: We recommend use of the average erosion rate for the forecasting period (in this case with other parameters selected by GSI, 1.72 fpy and 50 years, respectively).

- **Selection of the site-specific response parameter $m = 1/3$**
  GSI asserts that the presence of the beach in front of the eroding bluff justifies using a lower response parameter m equal to 1/3. However, the authors that formulate the simplified SCAPE equation used m equal to 1/2, and as reported by Ashton et al. (2011). Because selection of the value is somewhat arbitrary, we suggest at minimum exploring the sensitivity of the results by using a value of m equal to 1/2.

- **Role of wave action on bluff and resulting erosion**
  Although waves are not directly a parameter of the simplified SCAPE equation applied to the project, we think that the expected change in wave exposure will play a major role in erosion over the planning horizon. As described by MAI (2016), the primary failure mechanism of the bluff is undercutting at the toe by wave action. As sea-levels rise, the depth of water across the reef will increase, the depth limited waves incident to the bluff will increase, the wave runup and energy dissipated on the bluff will increase, and the erosion rate will increase. Therefore, use of the simplified SCAPE equation, which is based on steady coastal hydrology, is likely to under-predict future bluff erosion at this site. Other similar bluff erosion models that consider the waves are available, such as the full SCAPE numerical approach and methods developed by ESA (see ESA 2016, where this approach was used at Vallemar Bluffs in Moss Beach, California).

Assessing the sensitivity of the parameters listed above is expected to increase the erosion rates and therefore the total recession over a period of 50 years. ESA applied these modified values to the equation and found that the total recession amounts increased significantly (Table 1). We note that the GSI (2019) calculations apply the average rate of sea-level rise to the last 13 years of the planning horizon, and so, for comparison purposes only, we report the equivalent average sea-level rise rate and average erosion rates over the 50-year planning period using their reported totals. Recession results increase by almost 20 feet when utilizing the computed average sea-level rise rate over the whole planning horizon (Calc 1b). Increasing the response parameter *m* to 1/2 results in almost twice the amount of recession as reported by GSI (2019) (Calc 2). Finally, the recession totals are even greater when considering a slightly higher historic erosion rate of 1 fpy. Review of Plates 1 and 2 of the GSI (2019) study indicate that the reported bluff recession plus factor of safety of 1.3 and 1.5 result in a proximity of approximately 10 feet and less than 5 feet to the proposed structure, respectively. This suggests that the increase of the recession totals by 10 feet would result in the 50-year bluff recession intersecting the proposed structure, and that all of the parameters selected below increase the results beyond this threshold.

TABLE 1
SENSITIVITY OF RECESSION AMOUNTS TO PARAMETERS USED IN SIMPLIFIED SCAPE MODEL

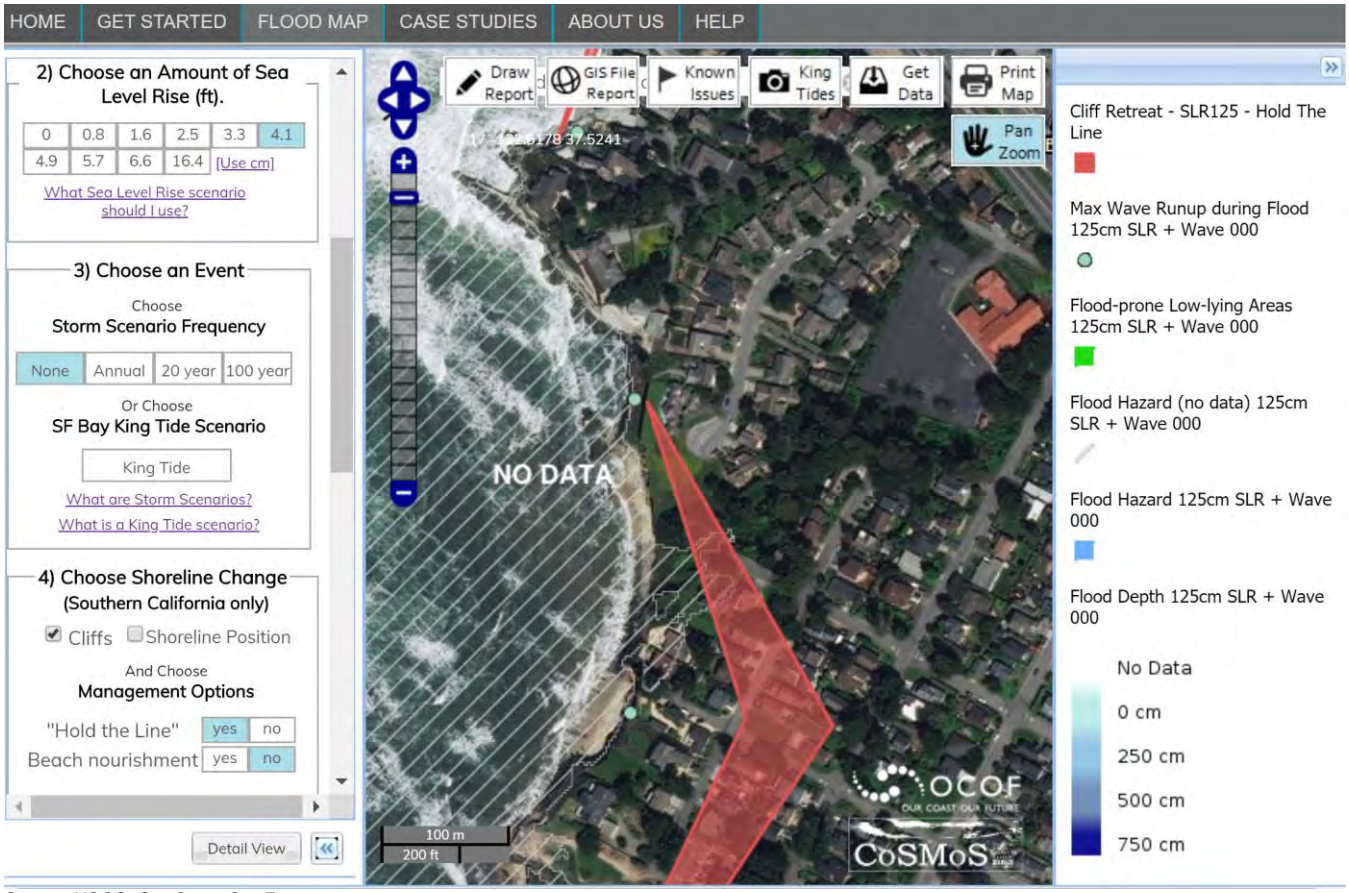
Parameter	1a - GSI Calc as presented (R2 = effective average)	1b - GSI Calc (R2 = average)	2 - modification (average R2, m=1/2)	3 - modification (average R2, m=1/3, R1=1 fpy)	4 - modification (average R2, m=1/2, R1=1 fpy)
S1 (fpy)	0.006595	0.006595	0.006595	0.006595	0.006595
S2 (fpy)	0.033[a]	0.0682	0.0682	0.0682	0.0682
m (const)	1/3	1/3	1/2	1/3	½
R1 (fpy)	0.78	0.78	0.78	1	1
R2 (fpy)	1.34[b]	1.70	2.51	2.18	3.22
delta t (years)	50	50	50	50	50
Retreat (ft)	66.8	85.0	125.4	108.9	160.8

a Equivalent value of projected average sea-level rise rate computed using equivalent projected average erosion rate resulting in total recession as presented by GSI (2016)
b Equivalent value of projected average erosion rate computed using the total recession value reported by GSI (2019) over the 50-year planning horizon.
Note: S1 = historic rate of sea-level rise; S2 = average rate of projected future sea-level rise over planning period; m = constant response parameter; R1 = historic rate of erosion; R2 = computed average rate of projected erosion over planning period, delta t is the planning period, Retreat is the total projected amount of bluff erosion.

The project proponents indicate with slope stability analysis that the proposed structure is within about 20 feet of the future bluff edge with a factor of safety of 1.3, and less than 10 feet from the future bluff edge with a factor of

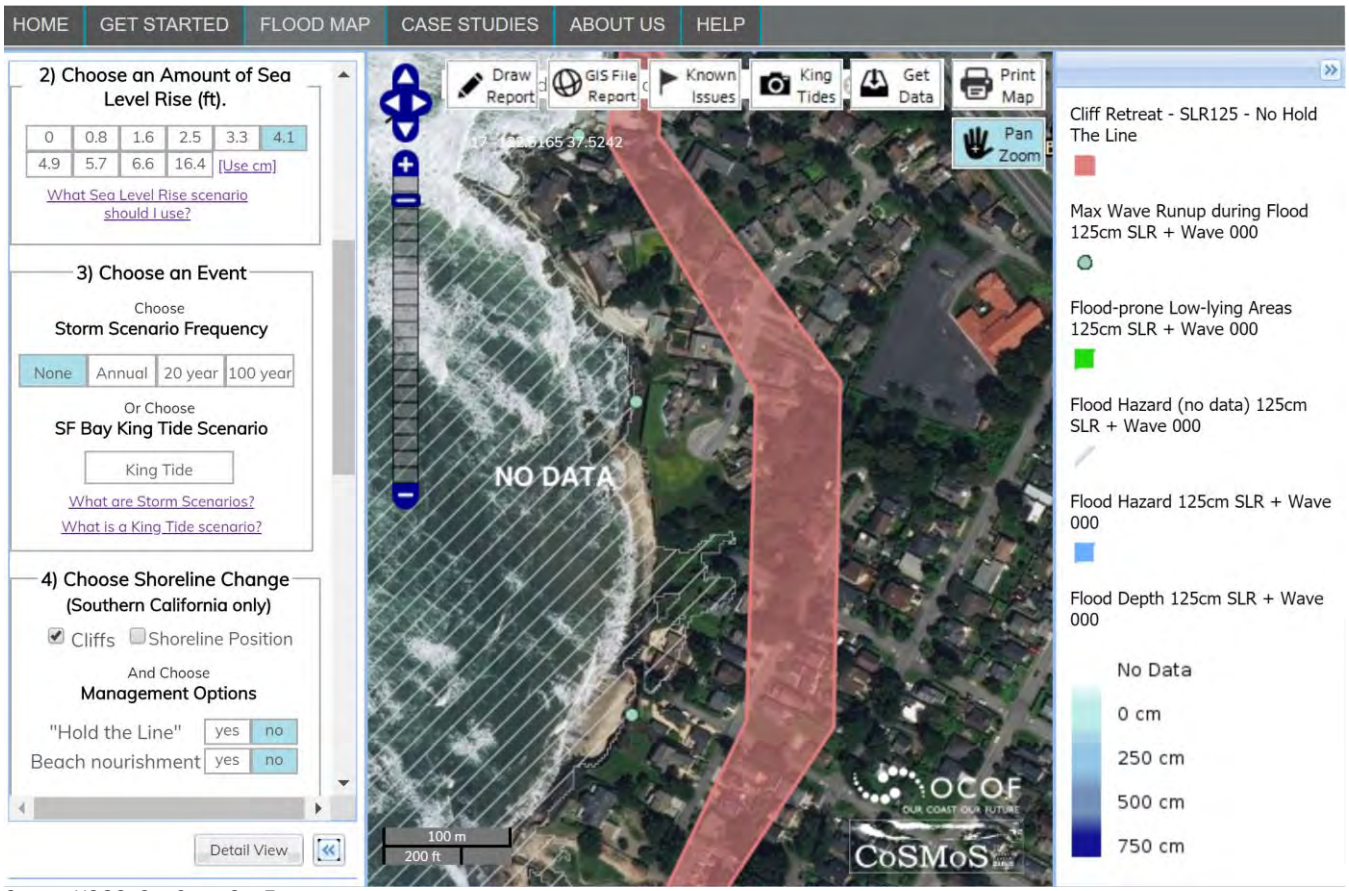
safety of 1.5 (GSI 2019), and the proposed structure is at risk if erosion encroaches within these distances. Based on the sensitivity analysis (described above), the GSI (2019) erosion projections are optimistic, leading us to conclude that it is very likely that the development is within the zone of future bluff erosion by 2069. Other methods, including those developed by ESA (e.g., ESA 2016; Battalio et al 2016), and others (e.g. Barnard et al. 2018), and including SCAPE, are expected to show that future erosion would intersect the proposed development within 50 years.

Note that the GSI (2019) study reports erosion projections by the USGS's Coastal Storm Modeling System (CoSMoS) for "hold the line" scenario only, in which areas with existing coastal armoring do not erode in the future (Figure 3). GSI (2019) does not describe the results for the scenario where erosion is allowed, which is presented in Figure 4. Note that the project site is located between two transects and so erosion at the site is computed as an interpolation between these points: the transect to the north is located at an existing coastal armor structure and the transect to the south is at an unarmored location. Although the USGS hazard mapping is a coarse and regional approach to assessing the coastal response to sea-level rise, the results provide an independent assessment produced by a credible federal agency.



Source: USGS, Our Coast Our Future

Figure 3
USGS CoSMoS erosion hazards with 4.1 feet of sea-level rise: "Hold the Line" scenario



Source: USGS, Our Coast Our Future

Figure 4
USGS CoSMoS erosion hazards with 4.1 feet of sea-level rise: "Allow Erosion" scenario

Recommendations

We recommend that the assessment of future bluff erosion amounts consider the sensitivity of the parameters used in the selected technical methods. As noted above, the values of the parameters selected in the analysis by GSI (2019) result in a conservatively low amount of total recession, and we think that a greater range in parameters should be considered, including a historic erosion rate of one foot per year, response parameter *m* of 1/2, and application of the average projected sea-level rise rate over the 50-year planning period rather than limiting this to the last 13 years of the planning period. Alternative technical methods that include the relative increase of wave action on the bluff with sea-level rise should be considered, as this was identified as a primary driver of bluff erosion at the site. Furthermore, we recommend considering a planning horizon of greater than 50 years so that adaptation planning of the site can be appropriately described.

References

Ashton, A.D., Walkden, M.J.A, and Dickson, M.E., 2011, Equilibrium responses of cliffed coasts to changes in the rate of sea level rise, *Marine Geology*, 284, pp. 217-229.

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From:	Steven King
To:	Martinez, Erik@Coastal
Cc:	Steven King
Subject:	Sharing current and recent information on 199 Arbor Lane proposed development site
Date:	Tuesday, March 24, 2020 2:05:18 PM
Attachments:	IMG_1231.jpeg P1010262.jpeg P1010265.jpeg IMG_3228.jpg IMG_3226.jpeg IMG_3210.jpeg IMG_3213.jpeg GeoSoils 199 Arbor Rpt analysis by Dr. King .pdf

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Dear Erik,

I realize you and your colleagues are experts at evaluating Coastal sites proposed for development but I thought that since you are relatively new to this 199 proposed development that these more bird, seal and printed views of the site and nearby site, where CCC to provide an opinion in 20102, might be useful. So I have attached images and one document previously provided to Sara in case you have not been able to visit the site. In fact several of us paddled kayaks from Rockaway to HMB sunday and the 2nd and third images are from Sunday with a Seals eye view. A brief description is provided below and I am happy to answer any questions you may have.

1. Ariel photograph provides view of eroding bluff top in front of proposed 199 development (site is yellow color) and second site below is the 263 Nevada site down the coast (site is in yellow also) where a CCC geologist recommend an 80 ft setback for a building permit on 12/20/12. The rate of erosion has accelerated since 2012 on both sites and it would appear that even an 80ft building setback from Cliff Bluff Top would likely not be adequate for the lifespan of the development.

2. The 2nd and third photographs where taken from Kayak on sunday and the large house on the right side of 1st photograph is the 263 Nevada site that has an 80 ft setback that was recommended in 2012 by the CCC geologist. The third photograph shows the Cliff Bluff Top on front of the proposed 199 development site.

3. The 4th-6th photograph show the eroding Cliff Bluff Top in front of the 199 proposed development site and the 7th shows the Creek side eroding bluff.

4. Is the response provided by myself to Sara and CCC, concerning a report provided by the developer from Geosoils Inc.

All these materials have been previously provided except the photographs 2 and 3 from kayak this past sunday.

If you have any questions please let me know and thank for your work. If there is any update on the project after your call this week with developer that can be shared I would be happy to receive it.

Bests wishes and thank you for your work and time.

Steve