

# Exhibit A

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Representatives from the California Coastal Commission, the Association of Monterey Bay Area Governments, and the Central Coast Wetlands Group are making presentations on efforts being undertaken by their organizations. Information provided below includes a summary of the actions they are taking and documents they have prepared.

For informational purposes, staff is also providing some other related Climate Change Hazards reports and data presented by the public (Exhibits I and J-5) or examples of other documents that are pertinent to the planning process in Monterey County.

## **CLIMATE CHANGE HAZARDS PRESENTATIONS**

### **AMBAG Presentation - Central Coast Highway 1 Climate Resiliency Study**

The County is participating with many other agencies on an effort being coordinated by the Association of Monterey Bay Area Governments to study effects of climate change on Highway 1 infrastructure. Much of the focus is related to stretches of the Highway around Moss Landing (**Exhibit H**).

This study will evaluate and identify the transportation needs, including the ultimate corridor concept in the Central Coast Highway 1 and rail corridor near the Elkhorn Slough area, while protecting and integrating the environmental needs of this unique corridor. This critical corridor is deficient with existing demand greatly exceeding the limited capacity at numerous intersections and conflict points, causing long delays. Highway and railroad infrastructure are currently prone to flooding and vulnerable to sea level rise, and are adjacent to valuable wetland habitats of an estuary of noted regional and national significance. Much of these valued habitats are also vulnerable to sea level rise. This study intends to provide measures that would increase the resilience of transportation infrastructure and habitat to sea level rise and climate change. Goals of the AMBAG study are to identify sea level rise adaptation approaches for Highway 1 that can do the following:

- Improve transportation safety and efficiency
- Promote healthy coastal habitats
- Provide economic security and benefits to the local community

During the Board of Supervisors presentation, Heather Adamson with AMBAG will discuss the study.

### **California Coastal Commission Presentation**

The Coastal Commission adopted the California Coastal Commission Sea Level Rise Policy Guidance in 2018 (**Exhibit F**). They are also working on a document (*Coastal Adaptation Planning Guidance: Residential Development*) related to residential construction and sea level rise. The draft document (March 2018) can be found at <https://www.coastal.ca.gov/climate/slr/vulnerability-adaptation/residential/>. During the presentation, Kelsey Ducklow from California Coastal Commission will discuss how they are assisting local governments in developing policies and regulations related to climate change.

### **Central Coast Wetlands Group Presentation - 2017 Monterey Bay Climate Change Report**

Under contract to the County, Ross Clark with the Central Coast Wetlands Group (CCWG) prepared the *Moss Landing Coastal Climate Change Vulnerability Report* (Report), dated June

2017 and will present the report's findings to the Board of Supervisors. (see **Exhibit D** for full report and **Exhibit E** for projected sea level rise scenarios). The report provides detail findings for the Moss Landing Community area and general findings for all other areas within the Monterey Bay coast. The Report allows staff and the community to utilize scientific information to develop policies and regulations for planning purposes and provides important information for other efforts, such as the County's work with AMBAG related to Highway One. This Report utilizes modeling scenarios for three emissions scenarios<sup>1</sup>—low, medium, and high—and identifies the critical coastal infrastructure in the North County area that may be compromised due to climate change effects. The Report further estimates when those risks may occur, defines appropriate response strategies for these risks, and discusses policy options that can be adopted within the Moss Landing Community Plan update.

The Report follows a guidance document provided by the California Coastal Commission that recommends all communities evaluate the impacts from climate change on various land uses. The guidance recommends using a method called “scenario-based analysis.” Since sea level rise projections are not exact, but rather presented in ranges, scenario-based planning includes examining the consequences of multiple scenarios of sea level rise, plus extreme water levels from storms and El Nino events.

This 2017 report identified vulnerable areas along the coastline of Monterey County: the Moss Landing Community area, the Pebble Beach golf courses, agricultural lands, low areas of development around Carmel and Castroville, coastal development south of Moss Landing (e.g., Monterey Dunes Colony), and County infrastructure in many locations.

The Report contains a Summary of Findings on pages vii and viii. The modeling and outcomes described in the Report assumes a medium emissions scenario for year 2030 and a high emissions scenario for years 2060 and 2100 modeling. Section 4.3 provides a good summary of future vulnerabilities for each of the three modeling years. This section provides a description of combined effects of coastal climate change by each modeled year, with a summary found in Table 6, *Vulnerability of Assets due to Combined Effects of Coastal Climate Change* (page 28). Projected SLR and an increase in storm frequency and intensity due to climate change would increase the frequency and severity of coastal flooding events. This combination would elevate the risk of damage to properties and infrastructure.

The Report also describes each hazard type in Section 5, Vulnerability by Coastal Hazard. The hazards associated with each of the modeled coastal processes (coastal storm flooding, coastal erosion, rising tides and fluvial flooding) threaten various types of coastal infrastructure differently. Wave and fluvial flooding can damage buildings, and temporarily restrict use of public amenities, make storm drains and tide gates ineffective and limit the use of roads and walkways. Many of these impacts are temporary and repairs can be made while other types of impacts require long-term programs to address necessary infrastructure improvements or relocation, or changes in land use. Dune erosion and monthly high tide flooding, for example,

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<sup>1</sup> As the earth absorbs energy from the sun, it must eventually emit an equal amount of energy into space and the difference between incoming and outgoing radiation is known as a planet's radiative forcing or “RF”. Climate change scenarios to predict how high earth's RF could be in the future are derived from plausible pathways, Representative Concentration Pathways (RCPs), for emissions of greenhouse gases. The highest scenario, RCP 8.5, reflects a track with little mitigative measures to reduce greenhouse gas emissions resulting in a net increase in radiative forcing of 8.5 Watts/m<sup>2</sup> by year 2100 relative to pre-industrial (year 1750) conditions. A medium level emissions scenario, RCP 4.5, reflects a future wherein changes in technology and energy usage stabilize the increase in net radiative forcing to 4.5 Watts/m<sup>2</sup> by 2100. The low emissions scenario is modeled after existing conditions.

are permanent impacts that will lead to extensive rebuilding, a change in use or abandonment of property. By analyzing the impacts due to separate coastal hazards, we can begin to plan adaptation strategies accordingly.

As an example of the value of these reports, projected climate change effects are depicted graphically for Moss Landing in Figures 11, 13, 17 and 19 (**Exhibit E** of this staff report). Table 7 (**Exhibit D**, page 30) show hazards at projected SLR conditions (in feet) under medium and high scenarios, as well as tidal height projections (in feet) in a 10-year tide event combined with medium and high emissions scenarios for the years 2030, 2060, and 2100. The affected area is greatly increased with events such as a 10-year tide event, where for example the 5.2 feet of projected sea level rise (year 2100, High scenario) increases to 12.9 feet during a 10-year tide event. Future studies related to hazard risk assessments should continue to look at the full range of climate change projections.

## **ADDITIONAL CLIMATE CHANGE HAZARDS INFORMATION**

### **Monterey County Hazard Mitigation Plan**

The County of Monterey developed and adopted the 2016 *Multi-Jurisdictional Hazard Mitigation Plan* (excerpts in **Exhibit B**; web link to full document), to identify and profile natural hazards, assess vulnerability, and plan for future maintenance. Sea level rise is addressed in the plan in Section 4.3.9. The plan also discusses coastal erosion (Section 4.3.2) and storm flooding (Section 4.3.6) hazards due to sea level rise and climate change. The current plan estimates an approximate 5-foot rise in sea level by the year 2100 along our coast. As summarized in the discussion, “sea level rise will be an amplifier of the magnitude for these other coastal hazards,” referring to coastal erosion and coastal flooding.

The current plan will be updated over the next year. Information about the update is found on the County website (<https://www.co.monterey.ca.us/government/departments-a-h/administrative-office/office-of-emergency-services/hazard-mitigation>).

### **2018 State Guidance**

The *State of California Sea-Level Rise Guidance* (**Exhibit C**—Executive Summary; web link to full document) was updated in 2018 and provides a science-based methodology for state and local governments to analyze and assess the risks associated with SLR, and to incorporate sea level rise into planning, permitting, and investment decisions. The State’s guidance outlines five steps to provide a decision framework to evaluate the consequences and risk tolerance of various planning decisions and should be used to guide selection of appropriate sea-level rise projections, and if necessary, develop adaptation pathways. These steps include: 1) Identify the nearest tide gauge; 2) Evaluate project lifespan; 3) From the nearest tide gauge and project lifespan, identify range of sea level rise projections; 4) Evaluate potential impacts and adaptive capacity across a range of sea level rise projections and emission scenarios; and 5) Select sea-level projections based on risk tolerance and, if necessary, develop adaptation pathways that increase resiliency to sea level rise and include contingency plans if projections are exceeded. This type of analysis will be critical for providing acceptable risk information for public infrastructure investment and for private development projects.

### **Moss Landing Community Plan – Community Sea Level Rise Workshops**

On August 29, 2018, staff gave a presentation to the Moss Landing Community on the 2017 Vulnerability Report. Staff also presented earlier versions of draft sea level rise policies to give the community a better understanding of recommended changes the County incorporated so they

could comment on those recommended changes. This took two meetings, the second one being September 19, 2018. One of the primary authors of the *Moss Landing Coastal Climate Change Vulnerability Report*, Ross Clark, was present at both meetings and was very instrumental in providing expert input to the community and County staff. A copy of the draft Moss Landing Community Plan Policy Matrix related to climate change is attached to give an idea of the community's comments (**Exhibit G**).

### **Other Studies and Information**

A lot of information is available on this topic, with new studies and guidance coming out regularly. In addition to the plans, reports and studies described above, a lot of additional information is available. County staff have used the National Oceanic and Atmospheric Administration's Sea Level Rise Calculator, a web mapping tool to visualize community-level impacts from coastal flooding or sea level rise: <https://coast.noaa.gov/digitalcoast/tools/slr.html>. Other calculators are available on line. The information from these calculators is useful for general purposes, but are subject to certain assumptions so are not sufficiently precise for individual areas or for development purposes. For example, accelerated coastal erosion or changes over time in protection infrastructure (natural or constructed) are not included in some of the calculator models.

A 2019 study regarding sea level rise impacts was also provided to staff for review (see **Exhibit I**). This study describes the infrastructure needs and the costs of such needs as a result of sea level rise impacts on a national level. While this study has a good scientific basis, staff has two concerns with the assumptions made. The first assumption is that sea walls are the only solution, and costs provided in this study are therefore related only to seawalls. This may be a good way to analyze infrastructure needs and costs on a national scale but may not necessarily be applicable at a local or regional scale. The second assumption the study made is allocating costs based on Population; that would not make sense in all cases.

Staff is providing five (5) miscellaneous studies attached under **Exhibit J** for general background information relating to climate change in our local area. Staff is providing these for information; presentations will not be made on these documents:

1. *The Monterey Bay National Marine Sanctuary – Final Management Plan*, Section II, Coastal Development, National Oceanic and Atmospheric Administration. This document provides Action Plans for Coastal Armoring, Desalination, Harbor and Dredge Disposal, and Submerged Cables as needed to protect the Sanctuary's resources.
2. The California Legislative Analyst's Office (*Preparing for Rising Seas: How the State Can Help Support Local Coastal Adaptation Efforts*). This document focuses on the state's role in responding to climate change, the importance of local governments planning for climate change, and how the state can provide assistance to local governments.
3. Ross Clark and the Central Coast Wetlands Group, who prepared the 2017 Monterey Bay Study used to update the Moss Landing Community Plan discussed above, are also working on other studies related to climate change in the Central Coast. Recently, they worked with the Salinas Valley Stormwater Plan development team to create a watershed enhancement prioritization model. The Storm Water Resource Plan for the Greater Monterey County Integrated Regional Water Management Region attached to this report guides the selection of lands for wetland, creek and riparian restoration that:

1) improves aquatic habitat and water quality for native species, 2) supports flood attenuation and storm water capture, 3) prioritizes lands that pose problems to successful farming, and 4) develops projects that provide open space and recreational opportunities for disadvantaged communities (i.e., Castroville). In addition, recent studies have recommended specific climate change adaptation management strategies (CCWG 2017, IRWMP 2018) which staff intends to develop through the MLCP Update.

4. *The Salinas River State Beach Dune Restoration and Management Plan, January 2016*, Central Coast Wetlands Group and Coastal Conservation and Research in partnership with California State Parks was developed to maintain the Salinas River State Beach (SRSB) dune protective barrier between the ocean and the low-lying Salinas Valley. A "Planning for predicted Sea Level Rise in the Salinas Valley" contract has been funded by the Wildlife Conservation Board, to collaborate with landowners of flood vulnerable lands to identify set back and other adaptation options for those areas of their lands (farms); and additional climate change work funded by the Department of Fish and Wildlife.
5. *The AB 691 Sea-Level Rise Assessment, Moss Landing Harbor Sea Level Rise Vulnerability and Adaptation Strategy Report* was prepared for the Moss Landing Harbor District by the Central Coast Wetlands Group in June 2019. Pursuant to Assembly Bill No. 691 (AB 691), the Moss Landing Harbor District is required to prepare and submit an assessment for addressing sea level rise to the State Lands Commission. Consistent with AB 691 requirements, the report identifies critical coastal infrastructure and critical coastal subtidal habitats that would be compromised by projected sea level rise. Appropriate response strategies and policy options addressing these risks are identified and discussed. In addition, the report quantifies potential financial losses of infrastructure within the predicted hazard zones and the costs of adaptation alternatives.

#### **Board of Supervisors Alternative Energy and Environment Committee**

On October 25, 2018, Staff presented the Moss Landing Community's desire to protect existing development in place to the Board of Supervisors' Alternative Energy and Environment Committee. Staff will return soon to the Board of Supervisors with a discussion related to efforts to update the Moss Landing Community Plan.

#### **STAFF RECOMMENDATION**

To determine the needed improvements, costs, and methods to allocate the costs with more accuracy for Monterey County, Staff is requesting that the Board of Supervisors direct Staff to seek funding to prepare a detailed climate hazards risk assessment and resiliency plan or plans. This detailed assessment would identify County infrastructure at risk, potential costs to provide resilient infrastructure, and potentially identify private property areas also at risk from climate change effects. This effort could look at the entire Monterey County coast to identify areas at risk, as well as identify infrastructure at risk from the effects of climate change, potentially including development of engineering design plans for the protection and/or adaptation of any at-risk infrastructure. The resiliency plan portion would look at adaptation techniques, including provisions for managed retreat where property and infrastructure are determined to be at risk.

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