M e m o r a n d u m

Making Conservation a California Way of Life

To: California Coastal Commission
1385 Eighth Street, Ste. 130
Arcata, CA 95521

Date: May 1, 2020

File: Eureka-Arcata Highway101
Corridor Improvement Project
HUM 101 / 79.9/86.3
01-36600 / 0100000127

From: Jason Meyer
Senior Environmental Planner
North Region Environmental

SUBJECT: CDP 1-18-1078 Special Condition 1, Baseline and Annual Reports

Special Condition 1. Sea Level Rise and Flooding Impact Monitoring and Reporting

Coastal Development Permit (CDP)1-18-1078 was issued to the California Department of Transportation by the California Coastal Commission on September 12, 2019. The permit covers the Eureka-Arcata U.S. Highway 101 Corridor Improvement Project, which consists of five component projects within a six-mile segment of Highway 101 along the east side of Humboldt Bay. In accordance with CDP 1-18-1078, Special Condition 1, the California Department of Transportation (Caltrans) is submitting the Sea Level Rise and Flooding Impact Monitoring Reports. This document contains the Baseline and the 2020 Annual Report.

The Baseline Report identifies existing water elevation conditions in Humboldt Bay at the North Spit Tide Gauge which provides data applicable to the U.S. Highway 101 Corridor (Corridor) segment. The Baseline Report presents data from April 1, 2019 through March 31, 2020. Additionally, the Baseline Report discusses locations established from which to take reference photographs to annually document King Tides and other extreme tidal events along the Corridor. Photographs of King Tide events from winter 2019/2020 are included.

The 2020 Annual Report documents the same set of water elevation data from the North Spit Tide Gauge as the Baseline Report. Subsequent Annual Reports will utilize the Baseline Report data to identify changes in water elevation conditions over time. Annual Reports include descriptions of any coastal hazards impacts to highway infrastructure along the Corridor, actions taken to address any impacts, and documentation of any closures within the Corridor during the annual reporting period, April 1 through March 31. The Annual Report also provides an update

on progress made in developing the Comprehensive Adaptation and Implementation Plan required by CDP 1-18-1078 Special Condition 2.

A. Baseline Report

A.1. Water Elevation

Water elevation baseline data was accessed for the North Spit Tide Gauge from the NOAA website (NOAA, April 2020) and referenced to NAVD88. The reporting period for this report is April 1, 2019 to March 31, 2020. Monthly maximum water elevations ranged from 7.67 feet to 8.86 feet. The highest observed tide of 8.86 feet was recorded on December 25, 2019. The mean monthly maximum water elevation for the reporting period was 8.21 feet (Figure 1). Monthly mean sea level ranged from 3.66 feet to 3.99 feet with a mean of 3.80 feet for the reporting period (Figure 2).

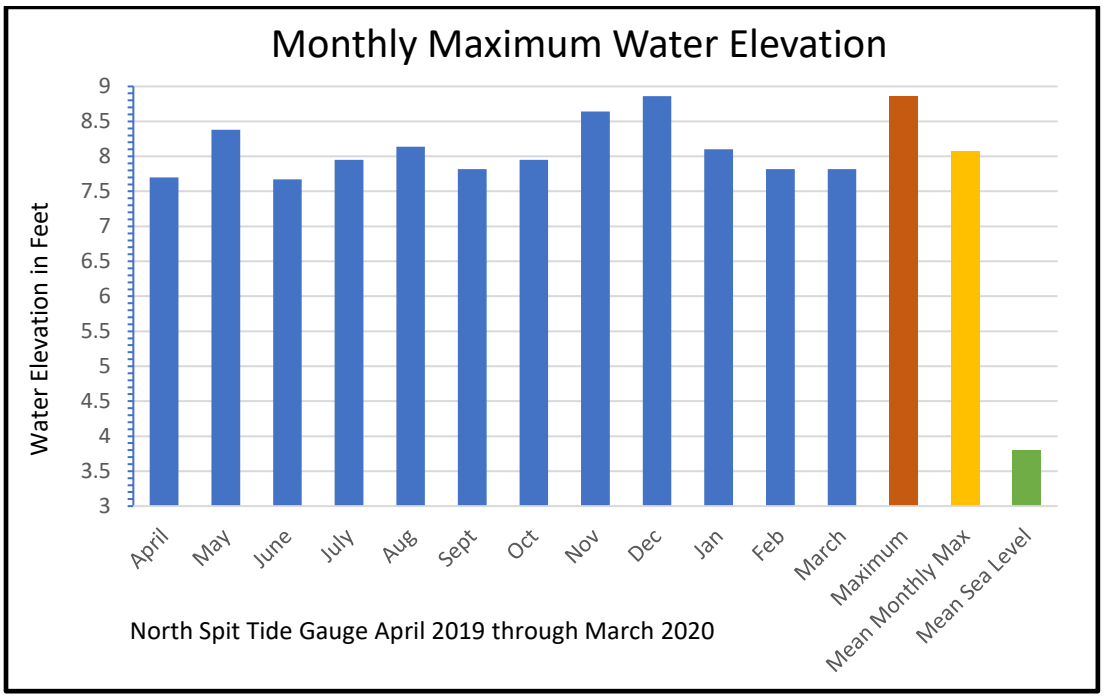

Figure 1 ***Monthly Maximum Water Elevation*** *shows the maximum water elevation by month at the North Spit Tide Gauge from April 1, 2019 to March 31, 2020. Monthly maximum and monthly mean sea level data were collected from the NOAA Tides and Currents webpage. Mean Monthly Maximum and Mean Sea Level were calculated using the NOAA data.*

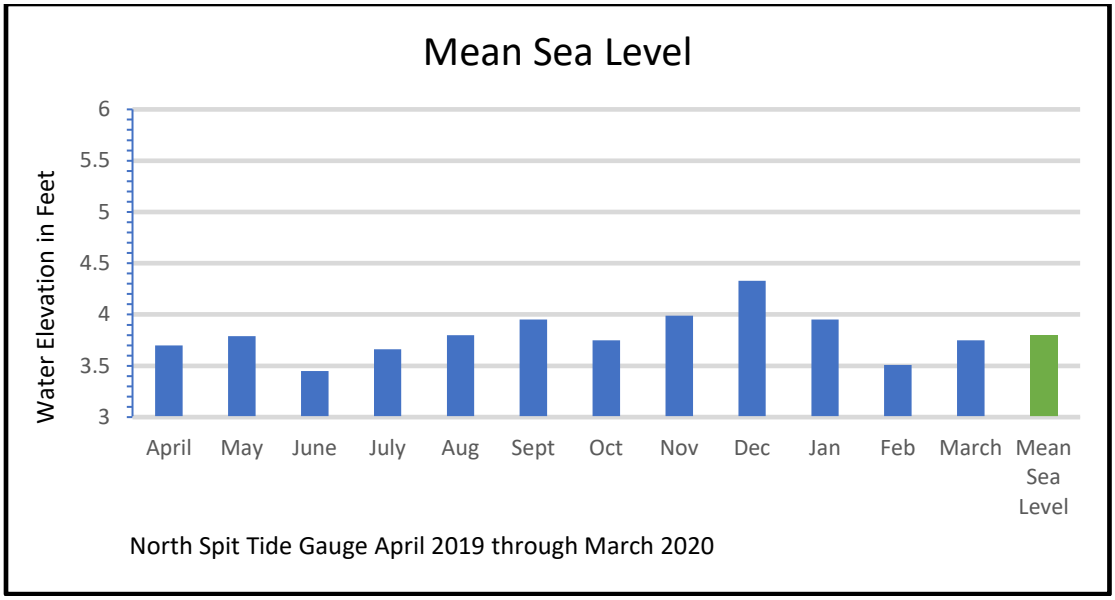

Figure 2 ***Mean Sea Level*** *at the North Spit Tide Gauge for April 1, 2019 through March 31, 2020 was calculated from available monthly sea level means from the NOAA Tides and Currents webpage.*

A.2. Reference Photograph Locations

Reference locations for photographing annual King Tide and extreme tidal events along the Corridor are organized in this Baseline Report in such a way as to easily facilitate replicating photos for future reports from approximately the same location and vantage point (Figure 3, Appendix A). Location selection criteria included accessibility and safety, vulnerability to flooding (Caltrans Eureka-Arcata Corridor: Sea Level Rise Vulnerabilities and Adaptation Solutions, 2019), and locations representing various shoreline cover and land use (Table 1).

For each of the ten selected locations, two to four photo sites were established (Appendix B). Site reference photos for Gannon Slough, Jacoby Creek, North Bracut, South Bracut, Indianola, California Redwood Company, Jacobs Tide Gate, Eureka Slough, and Cole Ave were taken close to high tide on December 23, 2019. Weather conditions were clear with an average wind speed of 2.8 miles per hour and no precipitation. The previous day saw 1.23 inches of precipitation (National Weather Service - Climate Date, Eureka CA Station). Site reference photos for Fay Slough were taken during the King Tide event on January 10, 2020. Weather conditions were cloudy with an average wind speed of 4.6 miles per hour and very minimal precipitation of 0.12 inches for the day. Light precipitation of 0.28 inches was recorded for the previous day. (NWS).

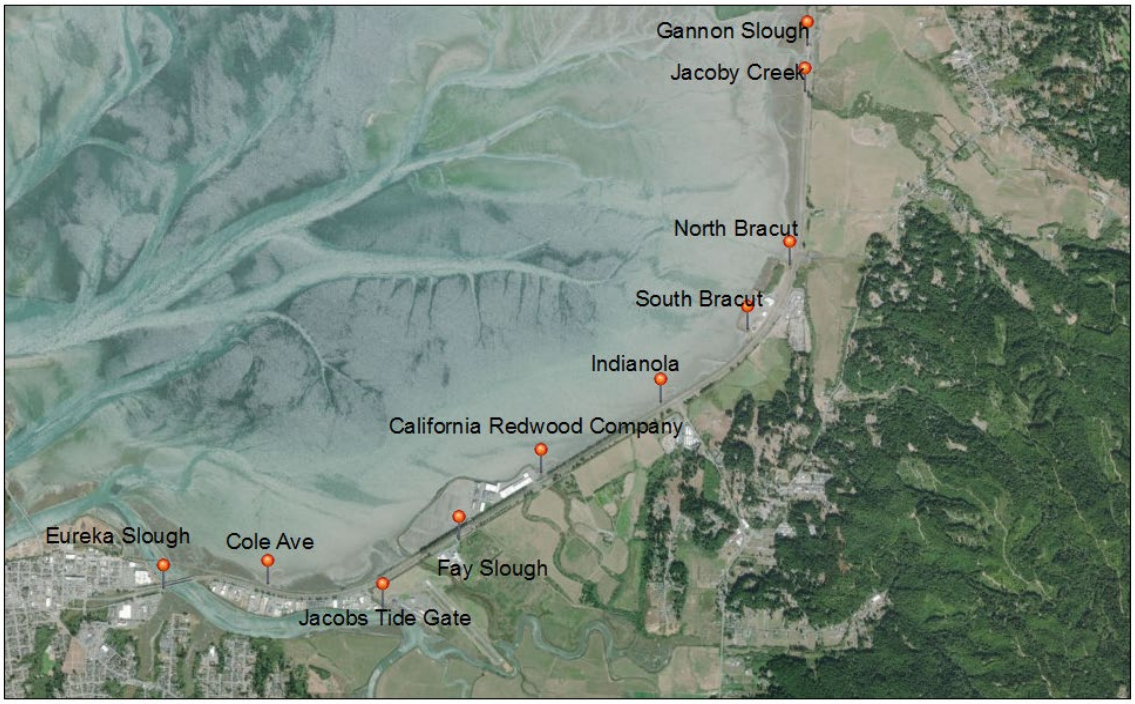

Figure 3 ***Photo Documentation Locations*** *along the Eureka-Arcata 101 Corridor.*

Table 1. Location Selection Criteria

	Accessibility and Safety	Vulnerability to Flooding	Shoreline Cover	Adjacent Land Use / Zoning
Gannon Slough	Good, *Bay Trail*	moderate-high	salt marsh, slough channel	Trail/Natural Resources (NR)
Jacoby Creek	Good, *Bay Trail*	moderate-high	salt marsh, creek channel	Trail/NR
North Bracut	Fair, *behind Bayside Garden Supply*	moderate-high	Bracut dike, railroad grade, vegetation	Businesses/NR and Industrial General
South Bracut	Fair, *near California Trailers*	moderate	Bracut dike, railroad grade, salt marsh	Businesses/NR and Industrial General
Indianola	Caution, *shoulder*	moderate	railroad grade, rock, exposed with areas of erosion	Future Trail/NR
California Redwood Company	Fair, *entrance to CRC*	moderate-high	railroad grade, salt marsh, rock, CRC levee to the south	Future Trail/ NR, Industrial General
Jacobs Tide Gate	Fair, *Airport Rd*	low-moderate	Jacobs Ave south side levee, rock protection	Businesses/Service Commercial
Eureka Slough	Good, *Eureka Waterfront Trail*	high	bank of Eureka Slough, rock, vegetation	Trail/Service Commercial/NR
Cole Ave	Caution, *shoulder*	high	railroad grade, rock, erosion bound by salt marsh to north and south	Future Trail/NR
Fay Slough	Fair, *CDFW parking lot*	subject to inland flooding from Fay Slough	roadside ditch paralleling hwy 101 north	Businesses/Service Commercial/ Coastal Agricultural

B. Annual Report

B.1. Water Elevation

Water elevation data for the 2020 Annual Report reporting period is the same as the Baseline Report as no previous Annual Reports have been completed. Therefore, there are no differentiations or new record maximum elevations to report. Refer to Figures 1 and 2.

B.2. Coastal Hazard Impacts

One temporary ramp closure was documented near the Corridor during the reporting period. A localized heavy precipitation event on September 18, 2019 impacted the State Route 255 southbound onramp onto U.S. Highway 101 near post mile (PM) 85.70. A culvert at this location was unable to accommodate the volume of precipitation, causing debris to accumulate on the shoulder. Debris clean up the following day, September 19, required temporary closure of the ramp for about half a day (Appendix E). This incident was not related to sea level rise. High tide recorded for September 18, 2019 was 7.06 feet.

King Tides for winter 2019/2020 took place January 10, 11, 12 and February 8 and 9, 2020. Caltrans staff photographed King Tide conditions from the established reference locations along the Corridor on January 10 and 11 and February 8, 2020 (Appendix C). Using high tide prediction tables published on the NOAA website, three-hour work windows were identified for when to best document King Tide conditions to capture the highest predicted tide for each day. Three teams of two staff were scheduled three hours each to document tides.

January 10 weather conditions were cloudy with an average wind speed of 4.6 miles per hour and very minimal precipitation of 0.12 inches. Light precipitation of 0.28 inches was recorded for the previous day. Maximum high tide from the North Spit Tide Gauge was 7.88 feet. January 11 weather conditions were mostly cloudy with an average wind speed of 7.3 miles per hour and very minimal precipitation of 0.11 inches. Very minimal precipitation of 0.12 inches was recorded for the previous day. Maximum high tide on January 11 was 8.10 feet. February 8 weather conditions were clear with an average wind speed of 13.1 miles per hour and very minimal precipitation of 0.02 inches. No precipitation

was recorded for the previous day (National Weather Service – Climate Data Eureka CA Station). February 8 high tide was verified as 7.84 feet.

In addition to documenting King Tides, Caltrans staff made efforts to document any observed extreme conditions and locations of erosion. These Additional Photos are included in Appendix D.

B.3. Adaption and Hazards Response

During the reporting period Caltrans implemented one temporary on-ramp closure near the northern end of the Corridor (see above). The hazard impact was due to heavy precipitation and not related to sea level rise. The Caltrans response involved a simple clean up of some debris by maintenance staff.

Additionally, no repair or maintenance was performed by Caltrans or other entities on dikes or berms that protect the highway. No impacts are anticipated that would require a planned response, an amendment to CDP 1-18-1078, or a separate CDP application before the next monitoring cycle.

B.4. Adaptation Plan Progress

Caltrans staff are addressing the requirements of the Comprehensive Adaptation and Implementation Plan (CAIP) required by CDP 1-18-1078 Special Condition 2. Strategies are being developed for thorough data collection and analysis, communication within the Department to ensure input from technical specialists, and collaboration with stakeholders in the region.

An analysis of current hazards in the Corridor including the collection of data provided in the Baseline and 2020 Annual Report and future Annual Reports will provide documentation of water elevation changes over time and highlight any areas of frequent flooding or other coastal hazards. Caltrans is using this information to help identify vulnerabilities in the Corridor and inform upcoming project design as well as long term sea level rise planning.

Two new staff positions have been created and are currently in the hiring process. One position within the Caltrans District 1 Planning Department to focus on the development of long term sea level rise adaptations, working on the Comprehensive Adaptation and Implementation Plan, and coordinating with

outside entities (County, Cities and private). And one position within the North Region Environmental project delivery office to function as a liaison between the California Coastal Commission and the Department. This position will coordinate with Coastal Staff and project staff to facilitate Coastal Development Permits, ensuring Caltrans staff are providing the information Coastal Staff need, and providing direction early in the process as to what issues the Coastal Commission may have with projects and how the project can be designed to address those issues. Both of these positions will continue work on sea level rise adaptations within District 1.

To assist in the identification of vulnerabilities throughout the Corridor, Caltrans is also exploring hiring a Geology graduate student from Humboldt State University (HSU). The student's master's thesis would contribute to Caltrans' vulnerability assessment. This work would assist Caltrans in developing amendment alternatives aimed at evaluating potential accommodation strategies to identified vulnerabilities and provide an opportunity for the assessment to be reviewed by scientific experts in relevant fields.

Caltrans has also engaged HSU students from the Senior Planning Practicum Course to provide a report on the status of sea level rise planning in the Humboldt Bay area. The report would identify stakeholders to be involved in sea level rise adaptation planning for the Corridor. Governmental and non-governmental agencies, private business owners, landowners, and residents would be interviewed to identify concerns and needs, current actions being taken to address sea level rise, perceptions of local sea level rise planning efforts, and what they would like to see in an outreach strategy. This would help inform Caltrans of the various entities they will need to contact for sea level rise planning collaboration and would identify approaches for successful outreach and education campaigns.

Caltrans is also working with Humboldt County, and funded a grant to study sea level rise in the southern portion of the Eureka/Arcata Corridor. The County has been working with local consultants developing models for potential scenarios and reaching out to various stakeholders. Caltrans plans to build on this information and continue reaching out to and working with the various stakeholders.

A timetable for implementation of the CAIP will be developed as planners collect additional data, assess identified vulnerabilities, and consult with technical experts throughout the Department. As sea level rise projections are updated based on best available science, the timetable will be modified.

B.5. Flood Events

No flooding from the Bay was documented during the reporting period. Inland flooding near State Route 255/U.S. Highway 101 interchange on September 18, 2019 is described in section B.2 and documented in Appendix E.

C. Frequent Flood Event Report

The roadway was temporarily closed once during the reporting period due to a localized heavy precipitation event not related to sea level rise (Appendix E).

Appendices:
A- King Tide Photo Locations
B- King Tide Reference Photos
C- King Tide Photos 1/10-11/20 and 2/8/20
D- Additional Hazards Photos
E- Flooding, Erosion, and Coastal Impact Report
F- NOAA and NWS Data

References:

California Department of Transportation (Caltrans). 2019. *Caltrans Eureka-Arcata Corridor: Sea Level Rise Vulnerabilities and Adaptation Solutions*. May 2019.

Observed Weather Reports (2020, April). In *National Weather Service*. Retrieved April 3, 2020, from https://w2.weather.gov/climate/index.php?wfo=eka

Water Level Reports (2020, April). In *NOAA Tides and Currents*. Retrieved April 3, 2020, from https://tidesandcurrents.noaa.gov/reports.html?id=9418767