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# F10a

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Staff: P. Allen-SF  
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## STAFF REPORT: MATERIAL AMENDMENT

**Amendment Application No.:** 1-18-1078-A1

**Applicant:** Caltrans

**Location:** A six-mile long segment of Highway 101 between Eureka and Arcata along the east side of Humboldt Bay (Eureka Slough Bridge, Eureka to the 11th St. overcrossing, Arcata).

**Description of Previously Approved Project:** Construction of the Eureka-Arcata Route 101 Corridor Improvement Project including: installation of median crossing closures; construction of new interchange at Indianola cutoff; extensions of highway acceleration & deceleration lanes; replacement of southbound Jacoby Creek Bridge; replacement of bridge rails on northbound Jacoby Creek and Gannon Slough Bridges; replacement of tide gates; and other roadway improvements.

**Proposed Amendment:** (1) Modify special conditions imposing hydro-acoustic limitations on pile-driving for the replacement of the southbound 101 Jacoby Creek Bridge; and (2) add an auxiliary lane on northbound 101 between the Bracut Maintenance Station and Bayside Road.

**Staff Recommendation:** Approval with conditions.

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## SUMMARY OF STAFF RECOMMENDATION

Staff recommends approval of Coastal Development Permit (CDP) Permit Amendment request 1-18-1078-A1 with a modified special condition.

On August 7, 2019, the Commission approved with conditions CDP 1-18-1078 the California Department of Transportation's application (Caltrans) to undertake the "Eureka - Arcata Route 101 Corridor Improvement Project." The project made multiple safety and infrastructure improvements along a six-mile stretch of Highway 101 directly adjacent to Humboldt Bay between the cities of Eureka and Arcata in Humboldt County. In part, the approved project will 1) replace the deteriorated 1920s southbound Jacoby Creek Bridge; and 2) modify and extend existing highway on-ramps and off-ramps (acceleration lanes and deceleration lanes) in the project corridor to meet current safety standards.

Caltrans now proposes two modifications to the approved permit. First, Caltrans proposes to connect the previously approved acceleration lane on northbound 101 at Bracut with the approved deceleration lane at Bayside Cutoff to form a continuous 2,250-foot-long auxiliary lane in between to further reduce auto merging hazards. The auxiliary lane does not require any additional wetland fill and will not encroach into nearby riparian ESHA.

Second, Caltrans proposes to amend Special Condition 10 to modify one of the acoustic threshold limits set for the pile driving activities necessary for the construction of the new southbound Jacoby Creek Bridge to protect threatened and endangered fish species, including the tidewater goby. Under Special Condition 10 of the CDP, hydroacoustic limits for pile driving are set at a peak maximum sound pressure (SPL) of 205 dB for any single pile driving strike, and an accumulated sound exposure level (SEL) at 187 dB for multiple strikes, except in the case of fish equal to or under 2 grams, such as the goby, in which case the SEL threshold is a stricter 183 dB. Additional analysis performed by Caltrans after approval of CDP 1-18-1078 indicate that the more stringent 183 dB limit of the original permit will significantly impact the construction schedule, extending the pile driving operations over multiple years. Recent studies have shown that there is no significant difference between the 183 dB threshold and the 187 dB threshold for protection of the tidewater goby. Additional analyses by Caltrans and biologists of the National Marine Fisheries Service and the U.S. Fish and Wildlife Service also indicates that the shorter construction schedule allowed by the less stringent 187 threshold will actually decrease impacts to the tidewater goby by avoiding repeated impacts to gobies during multiple breeding seasons.

Commission staff ecologist Dr. John Dixon has reviewed the new analysis and agrees that the change to the proposed acoustic threshold limit is very unlikely to directly impact the tidewater goby and that the shorter construction period will likely overall reduce the impacts to the goby due to project-related work. Therefore, staff believes the development as amended will remain consistent with the marine resource protection requirements of Section 30231 of the Coastal Act.

The motion to adopt the staff recommendation of approval of CDP amendment request 1-18-1078 with the modified special condition is found on page 4.

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### EXHIBITS

[Exhibit 1](#) – Regional Location Map

[Exhibit 2](#) – Vicinity Map

[Exhibit 3](#) – Project Description

[Exhibit 4](#) – Acceleration/Deceleration Lane Plans

[Exhibit 5](#) – Jacoby Creek Bridge Plans

[Exhibit 6](#) – Caltrans Hydroacoustic Criteria Memo (Jan. 2020)

[Exhibit 7](#) – Dr. Dixon Hydroacoustic Criteria Memo (Jan. 2020)

[Exhibit 8](#) – Dr. Dixon ESHA Memo (July 2019)

## I. MOTION AND RESOLUTION

### Motion:

*I move that the Commission **approve** the proposed amendment to Coastal Development Permit No. 1-18-1078 subject to the conditions set forth in the staff recommendation.*

Staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in conditional approval of the permit and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

### Resolution:

*The Commission hereby approves the coastal development permit amendment on the grounds that the development as amended and subject to conditions, will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit amendment complies with the California Environmental Quality Act because feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the amended development on the environment.*

## II. STANDARD AND SPECIAL CONDITIONS

Note: The original Coastal Development Permit (CDP No. 1-19-1078-A1 was approved with five standard conditions and twenty-seven special conditions. Standard Conditions 1-5 and Special Conditions Nos. 1-9 and Nos. 11-27 are reimposed without changes and remain in full force and effect. No new conditions are added to CDP 1-18-1078. **Special Condition 10** of CDP 1-18-1078 is modified as shown below and reimposed as a condition of the CDP as amended. New and deleted language appears as **bold double-underlined** and ~~**bold double-underlined**~~ text respectively. See [Appendix B](#) for the text of all the original permit conditions.

**10. Hydroacoustic Monitoring Plan.** PRIOR TO COMMENCEMENT OF CONSTRUCTION OF THE DEVELOPMENT AUTHORIZED BY COASTAL DEVELOPMENT PERMIT NO. 1-18-1078, the Permittee shall submit, for the Executive Director's review and written approval, a Hydroacoustic Monitoring Plan. Prior to submitting the plan to the Executive Director, Caltrans shall submit copies of the plan to the California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the National Marine Fisheries Service for their review and consideration. The plan shall include the following components:

- A. The plan shall be based on the "dual metric exposure criteria" set forth below and shall state that exceedance of either criterion shall be deemed injurious or lethal to exposed fish and non-compliant with the Conditions of the Coastal Development

Permit. The dual criteria for injury to fish are: 1. a peak Sound Pressure Level (SPL) at or above 206 dB (re 1 $\mu$ Pa) from a single hammer strike; or 2. an accumulated Sound Exposure Level (SEL) at or above 187 dB (re: 1 $\mu$ Pa<sup>2</sup>-sec) ~~for fish  $\geq$  2 grams and an SEL at or above 183-187 dB (re: 1 $\mu$ Pa<sup>2</sup>-sec) for fish  $\leq$  2 grams.~~ To estimate the sound energy to which a fish is exposed during multiple hammer strikes, NMFS uses the simple summation procedure where Total SEL = Single Strike SEL + 10 log (number of strikes). At a minimum, the Plan shall include all of the following:

1. Establish the field locations of hydroacoustic monitoring stations that will be used to document the extent of the hydroacoustic hazard footprint during pile-driving activities.
2. Describe the method of hydroacoustic monitoring that will continuously assess the actual conformance of the proposed pile-driving with the dual metric exposure criteria up- and down-stream of the pile-driving locations on a real-time basis, including relevant details such as the number, location, distances, and depths of hydrophones and associated monitoring equipment.
3. For all pile-driving activities that may produce measurable acoustic affects in the aquatic environment of Jacoby Creek, include provisions to continuously record pile strikes in a manner that tracks the time of each strike, the number of strikes, and the interval between strikes to be determined.
4. Include provisions for real-time identification and reporting of any exceedance of the dual metric exposure criteria, clear action and notification protocols to stop pile-driving in case of such exceedance, including the authority of the fisheries biological monitor to order pile-driving to stop immediately, and procedures to notify pertinent parties including the Executive Director and other pertinent state and federal agencies immediately after any exceedance of the dual metric exposure criteria.
5. Include a monitoring and reporting program that will be coordinated with the fisheries biological monitor and will include provisions to provide daily summaries of the hydroacoustic monitoring results to the Executive Director and to other agencies requesting such summaries, as well as more comprehensive summary reports on a monthly basis during the pile-driving season.

B. Compliance with the Dual Metric Exposure Criteria.

1. At Jacoby Creek, the Permittee shall avoid hydroacoustic noise at or above ~~183~~ 187 dB cumulative SEL, the level the U.S. Fish and Wildlife Service finds will result in unacceptable levels of “take” of fish  ~~$\leq$  2 grams, such as the endangered tidewater goby,~~ due to direct physical injury.
2. During pile-driving, the peak sound pressure level (SPL) within the Jacoby Creek aquatic environment shall not exceed 205 dB and the accumulated sound exposure level (SEL) shall not exceed ~~182~~ 186 dB at 10 meters distance from pile-driving or at any other location in the river.
3. If the accumulated SEL approaches ~~183~~ 187 dB at 10 meters distance from pile-driving, pile-driving will be stopped to avoid exceeding the criterion and will not commence again for at least 12 hours.

4. In the event of an exceedance of either criterion of the dual metric exposure criteria, pile-driving operations shall be immediately stopped and shall not recommence unless the Executive Director, in consultation with the fisheries biologists of the California Department of Fish and Game, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service, so authorizes based on the deployment of additional sound attenuation or other measures deemed likely by qualified technical experts to return the pile-driving to conformance with the dual metric exposure criteria.
  5. If the return to pile-driving after the implementation of the additional measures discussed in Subsection B(~~3~~4) above results in an exceedance of either criterion of the dual metric exposure criteria, pile-driving shall be stopped immediately and shall not re-commence until or unless the Commission approves an amendment to the Coastal Development Permit that proposes substantial changes to the proposed project that are deemed by the Executive Director to offer a high likelihood of success in preventing further exceedances of the dual metric exposure criteria.
- C. Project activities shall be conducted at all times in accordance with the provisions of the final approved plan. Any proposed changes to the final approved plan shall be reported to the Executive Director. Changes to the final approved plan shall require an amendment to the Coastal Development Permit unless the Executive Director determines that no amendment is legally required.

### **III. FINDINGS AND DECLARATIONS**

#### **A. BACKGROUND AND AMENDMENT DESCRIPTION**

On August 7, 2019, the Commission approved with conditions CDP 1-18-1078, authorizing the California Department of Transportation (Caltrans) to undertake the Eureka-Arcata Route 101 Corridor Improvement Project on a six-mile stretch of Highway 101 along the eastern shoreline of Humboldt Bay between the cities of Eureka and Arcata in Humboldt County, California. Specifically, the project area, hereinafter the “the Highway 101 Corridor,” extends from Postmile (PM) 79.9 by the Eureka Slough Bridge in Eureka to the 11th St. overcrossing in Arcata at Postmile 86.3. ([Exhibit 1](#))

The Eureka-Arcata Route 101 Corridor Improvement Project consists of a number of specific, separate, safety improvements to the existing highway, including closures of dangerous median crossings, highway acceleration and deceleration lane extensions to meet current safety codes, intersection improvements, bridge rail updates, tide gate replacements, and the replacement of the deteriorating 1920s Jacoby Creek Bridge. See [Appendix B](#) for a more complete description of those specific project components. The Commission approved CDP 1-18-1078 subject to 27 special conditions. Caltrans has not yet commenced development on the approved project for preliminary tree removal activities.

This permit amendment request proposes to modify CDP 1-18-1078 in two aspects.

First, CDP 1-18-1078 approved the extension of existing highway merging acceleration and deceleration lanes at several highway intersections to meet current safety standards, including the Cole Avenue, Mid-City Motor World, the former California Redwood Mill, Bracut, and Bayside Cutoff intersections. (See [Exhibit 4](#) for locations of original approvals.) As specifically relevant here, under CDP 1-18-1078, the Commission authorized Caltrans to modify and extend the acceleration lane at the Bracut intersection that merges onto the two-lane northbound portion of the highway. ([Exhibit 2](#).) At the next intersection to the north, the Bayside Cutoff intersection, Caltrans is authorized to modify and extend a deceleration lane exiting the highway. The end of the approved acceleration lane at Bracut and the beginning of the approved deceleration lane at Bayside Cutoff are separated by a narrow gap. The short gap has the potential to increase traffic conflicts between vehicles entering the highway at Bracut and others exiting the highway at Bayside Cutoff. Caltrans proposes to extend the previously approved acceleration lane on northbound 101 at Bracut a further 340 feet to connect with the approved deceleration lane at Bayside Cutoff, forming a continuous 2,250-foot-long auxiliary lane between the two intersections. The continuous auxiliary lane will provide more space for vehicles entering and exiting the highway to avoid each other and the other vehicles traveling past in the northbound direction. (See [Exhibit 4](#).) The new auxiliary lane would include a 4-foot wide shoulder running the length of the lane.

Second, CDP 1-18-1078 approved the replacement of the 1920s-era southbound Jacoby Creek bridge ([Exhibit 2](#)), which does not meet current highway standards and has deteriorating structural elements. Because the bridge construction involves work immediately adjacent to a coastal stream, the work could cause potential adverse impacts to coastal waters and sensitive marine species. (See [Exhibit 5](#).) Specifically, the bridge replacement includes pile driving of approximately 24 bridge piles for both the temporary rerouting bridge and the new Jacoby Creek Bridge. Although not in the creek bed itself, the pile driving has potential hydroacoustic impacts that could impact sensitive fish species in Jacoby Creek, including various salmon species and the tidewater goby.

Therefore, along with other mitigation measures to protect fish from pile driving, the Commission imposed Special Conditions 9 and 10 to protect fish species and their habitat during the installation of temporary and permanent piles related to the Jacoby Creek Bridge replacement. Special Condition 9, “Pile Driving Protections,” required Caltrans, among other things, to monitor pile driving activities and ensure compliance with the criteria of Special Condition 10. Special Condition 10, “Hydroacoustic Monitoring Plan,” required Caltrans to submit a Hydroacoustic Monitoring Plan that included “dual metric exposure criteria” that limited the hydroacoustic impacts of pile driving to specific criteria. As is explained in greater detail in [Section D](#) below, the dual criteria for injury to fish limit the impacts of pile driving to a peak Sound Pressure Level (SPL) exposure at or above 206 dB (re 1 $\mu$ Pa) from a single hammer strike and also set accumulated Sound Exposure Level (SEL) limits from multiple hammer strikes. For fish weighing above 2 grams, the accumulated SEL limit is “at or above 187 dB (re: 1 $\mu$ Pa<sup>2</sup>-sec).” For fish at or under 2 grams, the SEL limit is “at or above 183 dB (re: 1 $\mu$ Pa<sup>2</sup>-sec).” The more stringent hydroacoustic limit for fish at or less than 2 grams is intended to protect the tidewater goby. In the event the accumulated SEL threshold of 183 dB is reached, Caltrans is required to stop pile driving and wait a minimum of 12 hours before restarting.

Under this permit amendment request, Caltrans is proposing to modify the accumulated SEL limit for fish under 2 grams to the same as the other limit - “at or above 187 dB.” As explained in more detail below, Caltrans states that after the permit was approved with the 183 dB limit, they performed engineering analysis to understand the impacts of the increased limit. This analysis indicates that pile driving operations will quickly reach the 183 dB limit, and result in substantial, daily, stoppages of pile driving activities with 12-hour wait periods. These stoppages will result in significant extensions of the construction period for replacement of the bridge by several years. Caltrans asserts that the construction period necessitated by the more stringent limit would essentially render the bridge replacement infeasible and result in greater cumulative impacts to the tidewater goby.

Because of the logarithmic nature of the scale, the 187 dB criteria offers significantly longer windows for construction. Caltrans estimates that under the 187 dB criteria the project can be completed in its original estimated two years, but at the 183 dB criteria, the project will take over four years.

Additionally, based on more recent studies on hydroacoustic impacts and consultations with staff of the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS), it appears that the modification of the hydroacoustic criteria to 187 dB will have no measurable increase in take to the tidewater goby. Indeed, the increased timespan of construction activities may have greater impacts to tidewater goby habitat than increasing the pile driving hydroacoustic impacts from 183 dB to 187 dB. This is because the pile driving would be extended across multiple goby breeding seasons, disturbing goby burrows each time and preventing repopulation of the species in the Jacoby Creek area.

The coastal resource issues affected by the proposed permit amendment are limited to protection of marine resources, water quality, ESHA, flood hazards, and public access. As explained in the findings below, the proposed amended development would not lessen or avoid the intent of the approved permit.

## **B. STANDARD OF REVIEW**

The proposed project includes development that is located within both the retained CDP jurisdiction of the Coastal Commission and the CDP jurisdiction of Humboldt County, the City of Arcata, and the City of Eureka, each of which has a certified Local Coastal Program (LCP).

Under Coastal Act section 30601.3, when a project requires a CDP from both a local government with a certified local coastal program and the Commission, the Commission may process a consolidated CDP application for the proposed development when the applicant, the local government, and the Commission’s Executive Director agree to process the CDP as a consolidated CDP. In this case, Humboldt County, the City of Arcata, the City of Eureka, and Caltrans have all requested that the Commission process a consolidated CDP for this project, and the Executive Director has agreed.

The policies of Chapter 3 of the Coastal Act provide the legal standard of review for a consolidated permit application submitted pursuant to Section 30601.3. The local government’s certified LCP may be used as guidance



### C. OTHER AGENCY APPROVALS

No other agency approvals are required for the proposed development changes in this CDP amendment.

### D. PROTECTION OF COASTAL WATERS & MARINE RESOURCES

Section 30230 of the Coastal Act states as follows:

*Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Section 30231 of the Coastal Act states as follows:

*The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Coastal Act sections 30230 and 30231 require in part that marine resources and coastal wetlands and waters be maintained, enhanced, and where feasible restored. These policies specifically call for the maintenance of the biological productivity and quality of marine resources, coastal waters, streams, wetlands, and estuaries necessary to maintain optimum populations of all species of marine organisms and for the protection of human health.

The proposed project changes in the hydroacoustic criteria for pile driving adjacent to coastal waters at Jacoby Creek could potentially impact marine resources and biological productivity. (See [Exhibit 2](#) for Jacoby Creek bridge replacement location and [Exhibit 5](#) for a plan view.)

As discussed in the adopted findings for the original permit, the construction and demolition activities associated with replacement of the Jacoby Creek Bridge have multiple potential impacts to coastal resources. These impacts include the potential to negatively affect five endangered species of fish found present in the Jacoby Creek area: coho salmon, chinook salmon, steelhead, green sturgeon, and tidewater goby. The potential impacts stem from various construction activities in and near the creek. Some of these impacts include (a) direct contact by construction workers in the creek bed, (b) the discharge of sediment, pollutants, or debris from construction activities entering coastal waters, and (c) impacts from post-construction storm water runoff. Multiple Special Conditions in CDP 1-18-1078 address

these potential impacts through construction BMPs (Special Condition 12), an Erosion and Sediment Control and Pollution Prevention Plan (Special Condition 13), Herbicide Management (Special Condition 14), Debris Removal (Special Condition 16), and temporal limits to construction activities (Special Condition 21). Some of the specific protective measures for fish habitat in CDP 1-18-1078 include:

1. Restricting in-stream work to the period from July 1 through October 15 when juvenile salmonids are least likely to be present;
2. Not allowing equipment within the creek channel and restricting walking in the channel to low tide events when fish are less likely to be present;
3. Placing the bridge abutments above the mean high tide line, thereby avoiding excavation and construction within the Jacoby Creek channel;
4. Containing all bridge debris during demolition of the old bridge;
5. Placing temporary barrier fencing along the banks of Jacoby Creek to minimize visual disturbance to fish and prevent worker encroachment;
6. Implementing construction BMPs to minimize the input of sediment and increased turbidity; and
7. Insuring that a biological monitor will be present during in-stream work;

These measures remain in effect and will not be altered by this amendment.

### **Hydroacoustic Impacts Background**

Along with the potential impacts described above, the project could cause potential hydroacoustic impacts from the use of impact hammers used in bridge pile driving associated with the construction of the new Jacoby Creek Bridge.

As approved in the original permit, the replacement of the Jacoby Creek Bridge will require the placement of 24 36-inch diameter CSS piles: 12 piles to support the temporary construction bridge and 12 to support the new bridge. None of these piles will be placed in the active wetted channel of Jacoby Creek, rather they will be placed approximately 15-20 feet away from the creek. However, even pile driving by impact drivers that are set back some distance from a waterway can have impacts to fish species. Pile driving with an impact hammer generates hydroacoustic pressure impulses and particle velocities that can cause effects on fish ranging from altered behavior, hearing loss, and tissue injuries to immediate mortality. These underwater sound impacts can be measured by “Peak Sound Pressure Level (SPL),” the maximum value of an instantaneous sound pressure, such as that generated by a single strike on a pile by a pile driver, and “Cumulative Sound Exposure Level (SEL),” the summation of the sound energy associated with all pile strikes that occur over a given day. See Attachment C to [Exhibit 6](#) for a description of the fundamentals of hydroacoustic impacts.

In 2008, a Fisheries Hydroacoustic Working Group, composed of staff from federal and state agencies and supported by a panel of hydroacoustic and fisheries experts, generally agreed in principal to interim criteria to protect fish from pile driving activities.<sup>1</sup> These criteria were a

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<sup>1</sup> Agencies included the National Marine Fisheries Service, U.S. Fish and Wildlife Service, the California, Oregon, and Washington Departments of Transportation, the California Department of Fish and Wildlife, the U.S. Army Corps, and the U.S. Federal Highway Administration.

206 peak dB for peak SPL and a Cumulative SEL limits of 187 dB, except in the case of fish weighing equal to or less than 2 grams, in which case the Cumulative SEL was set to a maximum of 183 dB. The peak SPL is seldom reached, so pile driving is generally constrained by the cumulative SEL.

Under Special Conditions 9 and 10 of the original permit, to minimize hydroacoustic impacts, Caltrans is required to conduct hydroacoustic monitoring during pile driving operations and to stop operations prior to reaching the peak SPL limit and the cumulative SEL threshold. Once stopped, pile driving must not resume for a minimum of 12 hours to allow fish time to recover from exposure to sub-injurious hydroacoustic noise. Additionally, if 206 dB is hit on any single strike, pile driving must stop, and the Commission must be notified. Regular decibel readings must be collected and documented during pile driving activities (including driving to test load capacity) to ensure established noise thresholds are not exceeded.

Through the Final Environmental Impact Report process for this project, Caltrans developed a strategy for pile driving in consultation with the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS), and the California Department of Fish and Wildlife (CDFW) to minimize effects to sensitive fish species. (See [Appendix B](#), Adopted Findings for CDP 1-18-1078, pp. 89-90.) In developing the Final Environmental Impact Review document for the project and through subsequent consultations, Caltrans analyzed and developed mitigation measures for potential impacts to the fish species. In regard to four of the above five fish species, NMFS concurred with Caltrans that the project, as proposed and mitigated, “may effect but is not likely to affect” listed salmon, steelhead or green sturgeon or their individual designated critical habitat. Green sturgeon are not expected to be present in the Jacoby Creek water channel during construction. Salmonids, which are expected to weigh over 2 grams, may be present in the work channel area during construction. Caltrans adopted a number of mitigation measures in the project to limit these effects, which are captured in Special Conditions 9, 10, and 21 of CDP 1-18-1078. These measures include adopting a work window (July through October) that avoids the critical period of adult and smolt migration through the channel, working in tidal conditions that limit hydroacoustic exposure to salmonids, and complying with the hydroacoustic criteria limits of 206 peak dB for peak SPL and a cumulative SEL limits of 187 dB.

### **Hydroacoustic Impacts and the Tidewater Goby**

As noted above, tidewater gobies are also present in the Jacoby Creek area. Unlike the other fish listed above, tidewater gobies weigh less than 2 grams. The area potentially subject to hydroacoustic impacts to the tidewater goby is estimated at 0.39 acre of the wetted channel covering the portions of the channel extending approximately 80 meters upstream and downstream of the proposed bridge pile locations.

In their consultations, the USFWS and NMFS stated that gobies will be exposed to elevated sound levels and that hydroacoustic noise at or above 183 dB cumulative SEL could result in “take” of gobies within the 0.39-acre area due to barotrauma from pile driving. In addition, it was also estimated that there will be additional “take” due to physical damage to nesting gobies in about 0.044 ac of wetted channel from workers walking in the channel, and from the collapse of burrows within most of the wetted channel adjacent to piles due to vibratory forces from pile driving. Based on the construction timetable in place at that time, the

agencies concluded that those impacts would last over two construction seasons (e.g., two years).

Caltrans and the other agencies considered a number of factors in developing a strategy to protect the tidewater goby, including proposed hydroacoustic criteria. Factors considered in the analysis include: construction duration related to number of strikes per pile versus seasons, seasonal and tidal stages associated with timing of pile driving, life history of protected species and exposure under various pile driving scenarios, and noise level effects. These considerations were all weighed to determine which scenario would have the least damaging effect on protected species. In their consultations, Caltrans, USFWS, and NMFS agreed to a 187 dB limit for cumulative SEL in the case of the tidewater goby, even though the fish weighs less than 2 grams, given the numerous mitigation measures in place. The Caltrans FEIR therefore adopted the 187 dB limit for pile driving operations of the bridge replacement project.

However, in Special Condition 10 of CDP 1-18-1078, Commission staff recommended, and the Commission adopted, the dual hydroacoustic criteria adopted as interim standards in 2008 by the Fisheries Hydroacoustic Working Group, with a limit of 183 dB for fish less equal to or less than 2 grams to protect the tidewater goby from the hydroacoustic impacts of pile driving. Staff had recommended this condition because it found that the conclusion of the consultation with USFWS was simply that the level of harm to gobies from use of the 187 standard would not “jeopardize the continued existence of the species,” and staff concluded that was a “low bar.” Instead, staff recommended the dual interim criteria because the Commission must be able to find consistency with the requirements of 30230 and 30231 of the Coastal Act that the biological productivity of coastal waters be maintained and that the quality of coastal waters, streams, and estuaries appropriate to maintain optimum populations of marine organisms be maintained. Thus, the Commission concluded, based on the evidence available at the time, that incurring the harm to gobies by use of the 187 standard would not maintain optimum populations of the species.

### **Proposed Amendment**

Under the proposed CDP amendment, Caltrans proposes that Special Condition 10 be modified to substitute the 187 dB limit for the 183 dB limit to match the limit adopted in the FEIR for the project in consultation with the USFW Service and NMFS.

Caltrans staff, Commission staff, and staff from the USFWS and NMFS met on December 17, 2019 to review the proposed amendment and its reasoning. At the request of Commission staff, Caltrans prepared a Memorandum presenting the reasoning for the proposed hydroacoustic criteria amendment and submitted it on January 10, 2020 as part of this CDP amendment application (Caltrans Hydroacoustic Criteria Memo, [Exhibit 6](#)) The USFWS and NMFS support the proposed amendment. The Commission’s ecologist, Dr. Dixon, has reviewed the materials provided by Caltrans and provided his findings in an attached memorandum, which is the basis for the discussion below (“Dr. Dixon Hydroacoustic Criteria Memo Jan. 2020,” [Exhibit 7](#))

After the CDP was approved in August 2019, Caltrans conducted further analysis on the effect of the more stringent criteria and consulted with USFWS and NMFS. The analysis indicates that the more stringent 183 dB limit will significantly impact the project’s construction schedule,

extending the pile driving operations over multiple years. Along with resulting increased impacts to the tidewater goby, as discussed below, Caltrans states that the increased project construction period essentially makes the bridge replacement infeasible.

As discussed in the Caltrans Hydroacoustic Criteria Memo ([Exhibit 6](#)), Caltrans uses monitoring data from prior pile driving operations in similar environmental settings to model the likely pile driving hydroacoustic impacts for the Jacoby Creek Bridge replacement and to arrive at an estimated number of pile strikes required. The modelling is designed to account for the different substrate conditions at Jacoby Creek. Based on the modelling results, Caltrans estimates that 580 pile strikes are needed to complete the driving of each pile. Using the modelling information, at the 187 dB SEL limit, Caltrans estimates the bridge replacement construction would take two years, given seasonal, tidal, and noise constraints associated with installation of the bridge piles.

Caltrans estimates that the stricter 183 dB SEL limit would require an extra year of construction for each set of piles, extending the construction period by two years and up to a total of four years. These findings are summarized in Table 2 on page 9 of the Caltrans Hydroacoustic Criteria Memo ([Exhibit 6](#)) and in the chart below in Figure 1, both of which include best-case and worst-case scenarios. Table 2 relates the number of pile strikes under best-case and worst-case scenarios to reach the 183 and 187 cumulative dB SEL thresholds to the estimated number of working days per pile, the number of working days per bridge, and the number of construction seasons for each bridge. The chart demonstrates the logarithmic nature of the hydroacoustic criteria thresholds and that there can be a substantial difference in time before pile driving is stopped under the two criteria.

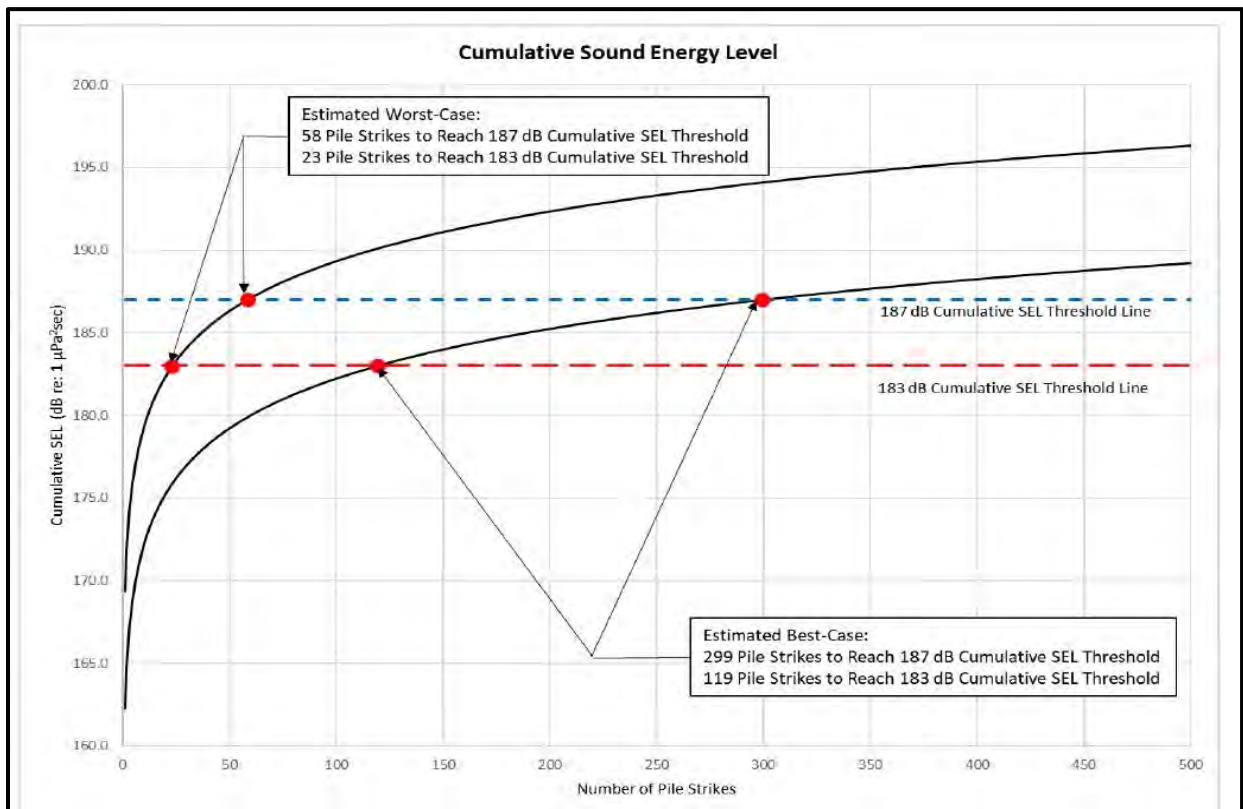


Figure 1: Estimate of Number of Pile Strikes Before Stoppage for Cumulative SEL Limits.

More importantly, recent studies have shown that there is no clear necessity for the stricter criteria of 183 dB SEL compared to the 187 SEL dB and that the 183 SEL dB limit is overly conservative. These studies, conducted by an international panel of technical experts convened in 2009 by NOAA Fisheries are discussed in more detail in the Dr. Dixon Hydroacoustic Criteria Memo ([Exhibit 7](#), pp.3-4). In summary, the 2008 interim criteria were intentionally conservative in the direction of protecting sensitive fish species in light of limited evidence and studies available at the time. More recent studies resulted in new recommended 2014 guidelines that have been published in the scientific literature. As discussed in Dr. Dixon's memo, the recommended 2014 guidelines and more recent assessments indicate that fish without swim bladders, such as the tidewater goby, are less susceptible to hydroacoustic impacts than fish with swim bladders, and in either case, the cumulative SEL threshold at which tidewater gobies are thought to suffer injury would be over 203 db. These recommended guidelines have not been adopted, however, because the Hydroacoustic Working Group ceased meeting regularly and has not convened to consider and formally adopt them.

Based on these studies and the as yet unadopted 2014 guidelines, it appears there is no measurable difference between the 183 dB imposed in Special Condition 10 and the currently proposed 187 dB criteria for protection of the tidewater goby. Dr. Dixon's memo concludes that "[b]ased on the proposed 2014 Guidelines, underwater noise from pile-driving is very unlikely to directly impact tidewater gobies during bridge replacement at Jacoby Creek by either peak SPLs or cumulative SELs" of 187 dB ([Exhibit 7](#))

Furthermore, recent Caltrans analysis and consultations with biologists of NMFS and USFWS also show that by extending the construction schedule over multiple construction seasons, the project will require repeating impacts to tidewater gobies during multiple breeding seasons. The tidewater goby is mainly an annual species, with a die-off of adults after each spring spawning season. Population numbers often vary widely from year to year, but even a complete loss of reproductive success for a year will probably be made up by immigration to the site by younger fish the following year. However, it is unclear if such repeated breeding season losses can be sustained. NMFS staff also indicated that their standard is not just to prevent a level of harm that would jeopardize the continued existence of the species, but to avoid any take to the maximum extent possible. They believe their recommended balancing of the hydroacoustic criteria and duration of seasonal impacts best accomplishes that goal.

As noted by Dr. Dixon, gobies are known to be present in Jacoby Creek, "but the size of the population and the distribution of individuals is completely unknown." Given the nature of the tidewater goby, it is unclear how much, if any, "take" will occur from the hydroacoustic impacts of pile driving. It is clear, however, that there will be direct take from the limited construction activities that bring workers into contact with the water bed. It is estimated that workers will have to walk in the channel on about 22 occasions each season to install, maintain, and remove the debris containment system. These impacts cannot be further avoided than by employing the limits and mitigation measures already contained in the special conditions of CDP 1-18-1078. Reducing the number of seasons of direct physical disruption, as well as the length of time of hydroacoustic impacts, is therefore important for minimizing impacts on the tidewater goby and maintaining its populations.

Thus, the longer construction period necessitated by the stricter dB limit of the original permit will potentially result in greater impacts to the tidewater goby than the 187 dB limit of the proposed amendment. Caltrans states that the project as developed with NMFS, CDFW, and USFWS was determined to be the least environmentally damaging alternative as it minimizes impacts to tidewater goby by limits impacts to a small area, adheres to protective hydroacoustic parameters, includes other protective measures, and keeps the number of working seasons to a minimum. Raising the cumulative SEL threshold to 187 dB would allow completion of construction in a shorter time frame, thereby minimizing exposure of the tidewater goby to construction-related impacts.

As noted above, Commission staff, including staff ecologist Dr. John Dixon, have consulted with biologists at Caltrans, NMFS, and USFWS, and Dr. Dixon has independently reviewed the conclusions of recent reviews of the scientific literature on hydroacoustic impacts to fish conducted by members of the international panel of technical experts convened by NOAA Fisheries in 2009. Staff concurs that the updated acoustic threshold will best protect the tidewater goby and is the least environmentally feasible damaging alternative.

Therefore, the Commission finds that the proposed amended development will maintain the functional capacity of the habitat, maintain and restore optimum populations of marine organisms, and protect human health as mandated by the requirements of Sections 30230 and 30231 of the Coastal Act.

## **E. ENVIRONMENTALLY SENSITIVE HABITAT AREAS**

Coastal Act Section 30240 states:

### ***Section 30240 Environmentally sensitive habitat areas; adjacent developments***

*(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*

*(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The Coastal Act defines environmentally sensitive habitat areas (ESHAs) as areas in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments (Section 30107.5). Coastal Act section 30240 allows only resource-dependent development in environmentally sensitive habitat areas and requires that development adjacent to sensitive habitats be sited and designed so as to not significantly degrade the habitats.

The Eureka-Arcata 101 Corridor project includes the removal of approximately 95 trees and shrubs in some seven distinct different areas alongside the highway, totaling approximately 1.56 acres in area. These trees and shrubs are to be removed from the highway shoulder areas to meet current safety clearance standards. As part of the Commission's review of the original project, Commission staff, including Dr. Dixon, conducted a site visit to review the seven proposed locations and determine if any of the trees and shrubs would be considered ESHA. These findings are discussed in a memorandum of July 24, 2019 prepared by Dr. Dixon ([Exhibit 8](#)). Dr. Dixon concluded that two of the areas could be considered ESHA, and the Commission adopted that conclusion in the original CDP. As discussed in Dr. Dixon's memo and the Commission's findings for CDP 1-18-1078, the two areas were adjacent to highway drainage ditches. The Commission has often found that riparian habitats meet the definition of ESHA, but this has generally been in the context of natural water bodies. However, in this instance, the Commission determined that two areas of riparian habitat in drainage ditch areas qualified as ESHA because (a) the ditches connect to the bay and provide potential salmonid habitat, and (b) the adjacent trees provide shade and cover, protection from storm runoff, and provide woody debris material and litter fall that supports organic riparian habitat. Commission staff worked with Caltrans staff to reduce or eliminate the amount of trees to be removed in ESHA areas. The Commission approved the removal of the remaining trees supporting ESHA through conflict resolution in the CDP.

The proposed extension of the approved acceleration and deceleration lanes to form an auxiliary lane between Bracut and Bayside Cutoff under this amendment is adjacent to one of the narrow drainage ditches found to be ESHA, a strand labelled Strand 5A. (See Dixon ESHA Memo, p. 7, [Exhibit 8](#)). However, the proposed auxiliary lane will neither encroach into any existing wetlands and the identified riparian ESHA nor necessitate removal of any additional trees beyond those already approved in the original permit to ensure sufficient clear view area for motorists or for any other purpose. [Exhibit 4](#) provides an overview of the construction area for the new acceleration/deceleration lanes and shows that no further trees will be removed than those already approved in CDP 1-18-1078. The proposed lane modification is part of the existing highway and will expand that highway some a few feet eastward, but that expansion will not create any additional impacts to any known or potential ESHA areas. A separated area will remain between the roadway and the riparian area to buffer the ESHA from impacts from the highway. The highway construction activities are also already subject to multiple conditions protecting adjacent areas by requiring construction BMPS (Special Condition 12), an erosion control and sediment management plan (Special Condition 13), herbicide management (Special Condition 14), and debris removal (Special Condition 16), as well as the protection of potential nesting habitat (Special Condition 21). These special conditions are not modified by the permit, as amended, and remain in full force and effect to protect the adjoining ESHA from adverse impacts.

Therefore, the Commission finds that the proposed amended development as conditioned with the proposed auxiliary lane from Bracut to Bayside is sited and designed to prevent impacts which would significantly degrade the adjacent riparian ESHA and will be compatible with the continuance of that habitat consistent with section 30240(b) of the Coastal Act.



## F. PUBLIC ACCESS

Section 30210 of the Coastal Act requires that maximum public access shall be provided consistent with public safety needs and the need to protect natural resource areas from overuse. Section 30211 of the Coastal Act requires that development not interfere with the public's right to access gained by use or legislative authorization. Section 30212 of the Coastal Act requires, in part, that new development projects provide access from the nearest public roadway to the shoreline, except where it is inconsistent with public safety, military security, or protection of fragile coastal resources, or where adequate access exists nearby.

In approving the original permit, the Commission found that the proposed highway improvements were consistent with the public access policies of the Coastal Act. The proposed changes under the amendment to the hydroacoustic criteria for pile driving presents no possible new impacts to public access.

The proposed changes under the amendment to convert the approved acceleration and deceleration lanes into a full auxiliary lane between Bracut and Bayside also have no significant adverse impacts on public access. (See [Exhibit 4](#) for an overview of the lane changes.) Highway 101 provides a critical link for the public to access significant stretches of the coast in the Humboldt Bay region and beyond, as it is the main traffic conduit north and south along the coast through Humboldt and Del Norte counties. (See, e.g. [Exhibit 1](#).) In the more immediate vicinity, just beyond the southern project limit, Highway 101 provides access to the Coastal Trail that extends along the entire length of the bay shoreline of the City of Eureka. Just west of the northern end of the project, Highway 101 can be used to access the shoreline along the Arcata Marsh and Wildlife Sanctuary. By increasing the safety and smooth flow of transportation in this stretch of Highway 101, the project will result in improvements to public access. In addition, as discussed in the findings for CDP 1-18-1078, as part of the overall Highway 101 Corridor Improvement Project, Caltrans has supported the completion of a separated Class I bicycle and pedestrian trail alongside Humboldt Bay connecting the cities of Eureka and Arcata. That trail runs parallel to Highway 101 but provides separated, enhanced, and safer cycling access for the corridor in both directions between Eureka and Arcata. Caltrans provided significant funding and planning staff support to complete the north end of the trail, which currently connects the city of Arcata to just south of the Bayside intersection. As discussed in the findings for CDP 1-18-1078, Caltrans is providing significant funding and planning staff support to complete that trail between the two cities.

However, cyclists currently use the existing highway shoulders for public access through the corridor, and the corridor serves as the designated Pacific Coast Bike Route through this area. Caltrans classifies the existing Route 101 corridor on-shoulder bike route as a Class III Bikeway that "designates a preferred bike route through a high demand corridor and provides for shared use with motor vehicle traffic." Except at intersections and along acceleration and deceleration lanes, the outside highway shoulder width in both directions is ten feet for the length of the project corridor. As approved by the Commission in the original permit, the acceleration and deceleration lanes have shoulder widths of four feet. This proposed amendment would extend the acceleration lanes and deceleration lanes between Bracut and Bayside an additional 340 feet, and replace the existing 10-foot-wide shoulders in that stretch with four-foot-wide shoulders for that section of Highway 101.

For a number of reasons, the proposed change in shoulder width will not result in significant adverse impacts on coastal access for bicyclists. First, the proposed change only affects 340 feet out of a 6.3 mile stretch of highway, which is a minor amount. Secondly, the proposed change does not eliminate shoulders for cyclists but reduces them from 12 feet to 4 feet. Four feet is generally accepted as a safe shoulder width standard for bicyclists traveling in the same direction.

Thirdly, although bicycle use along Highway 101 currently exists, the highway is not a substantial cycling recreational corridor – the Caltrans Final Environmental Impact Report for the original project included a survey finding approximately 20-30 cyclists a day in the Highway 101 corridor as a whole. Moreover, bicycle use of the highway itself is already reduced largely through use of the existing portions of the Humboldt Bay Trail and bicycle use of the highway will be further reduced when the county completes the trail, which it currently estimates for 2021. Once complete, there will be little need to use the Highway 101 shoulders for cycling access.

Lastly, for any cyclists that do use this stretch of highway, the auxiliary lane itself provides additional protection. The auxiliary lane will provide distance and separation from the two primary through lanes of the northbound portion of the highway. When cars use the auxiliary lane, they should be moving at slower speeds and thus more aware of potential traffic conflicts with local traffic and bicyclists.

For all of the above reasons, the Commission finds that the proposed amended development is consistent with the public access policies of the Coastal Act.

## **G. GEOLOGIC AND FLOOD HAZARDS**

Section 30253 of the Coastal Act states, in applicable part:

*New development shall do all of the following:*

- a) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
- b) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs...*

The proposed amendment includes the modification of the previously approved acceleration and deceleration lanes into an auxiliary lane. The modification adds 340 feet of highway merging lane on the eastern, inland side of the highway. As discussed in the adopting findings for the CDP ([Appendix B](#), pp. 50-68), the Eureka Arcata Highway 101 corridor as a whole is an area subject flooding risks and increased risks from Sea Level Rise. The area at risk includes the specific area at issue in this amendment from Bracut to Bayside. This section of road is within the stretch analyzed by Caltrans in an analysis provided for the original project and described as “Jacoby Creek and Gannon Slough (PMs 83.6 to 85.0).” The shoreline in this stretch has been rated as highly vulnerable to SLR flooding (Laird, 2018). The proposed lane extension is on the east, inland, side of the highway, where much of the land is open agricultural land. However,

these agricultural lands rest on former bay tidelands, and the area is susceptible to flooding from increased groundwater elevations with SLR. To summarize the findings in the original CDP, the Commission found that under the Ocean Protection Council's (OPC's) medium-high and extreme risk scenarios, approximately 2 feet of SLR can result in Mean Monthly Maximum Water (every month) flooding by 2050 for the medium-high risk scenario and by 2040 for the extreme risk scenario. This road segment may also experience flooding during 10-year and 100-year storm events with minimal SLR, which could also occur before 2030 under OPC's medium-high and extreme risk scenarios.

The Commission approved CDP 1-18-1078 subject to Special Conditions 1 and 2 to ensure consistency with the Coastal Act hazards policies of Section 30253. Among other things, these conditions require Caltrans to prepare a SLR Baseline Report by May 1, 2020, undertake SLR monitoring and submit yearly reports beginning in 2020, undertake local stakeholder and local government SLR planning coordination, and develop and submit a SLR adaptation plan for the entire Highway 101 corridor by December 31, 2025. Caltrans is also required to return for a CDP amendment if flooding begins to significantly impact (more than once a year) the highway corridor before a corridor SLR adaptation plan can be developed and implemented.

This amendment only marginally expands the highway by connecting the acceleration and deceleration merging lanes already approved by the Commission and does not significantly increase the risk of SLR related flood hazard threats for the project. (See [Exhibit 4](#).) Caltrans staff have been actively working to comply with Special Conditions 1 and 2 of the CDP, including: performing the first King Tide monitoring in January 2020; developing a draft baseline report to timely submit on May 1, 2020; submitting a draft plan to Commission staff to develop the yearly monitoring reports and an outline of the final adaptation plan; funding local government SLR planning efforts such as the Humboldt County SLR Adaptation Plan for the Eureka Slough Hydrological Unit (southern stretch of Highway 101 Corridor); and developing plans to fund and staff the SLR adaptation planning.

As Caltrans is working to comply with the SLR planning and adaptation requirements of Special Conditions 1 and 2 of the original permit and because the amended development does not significantly increase the risk of flooding hazards, the Commission finds that the amended development as conditioned is consistent with section 30253 of the Coastal Act.

## **H. CALIFORNIA ENVIRONMENTAL QUALITY ACT**

Caltrans served as the lead agency for the project for California Environmental Quality Act (CEQA) purposes. Caltrans adopted a final programmatic environmental impact report for the project on January 20, 2017.

Section 13096 of the Commission's administrative regulation requires Coastal Commission approval of coastal development permit applications to be supported by a finding showing the application, as modified by any conditions of approval, is consistent with any applicable requirements of the CEQA. Section 21080.5(d)(2)(A) of CEQA prohibits approval of a proposed development if there are any feasible alternatives or feasible mitigation measures available, which would substantially lessen any significant adverse effect the proposed development may have on the environment.

The Commission incorporates its findings on conformity with Coastal Act policies at this point as if set forth in full. As discussed above, the project as proposed to be amended has been conditioned to be consistent with the policies of the Coastal Act. No public comments regarding potential significant adverse environmental effects of the project amendment were received prior to preparation of the staff report. As specifically discussed in these above findings, which are hereby incorporated by reference, mitigation measures that will minimize or avoid all significant adverse environmental impacts have been required. As conditioned, there are no feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse impacts which the activity may have on the environment. Therefore, the Commission finds that the proposed amended development, as conditioned to mitigate the identified impacts, can be found to be consistent with the requirements of the Coastal Act to conform to CEQA.