

Watsonville Slough Ecosystem Restoration, CAP 1135 Review Plan (Execution Sheet)

(using Template 3.12.18)

27 February 2023

Project Title: Watsonville Slough Ecosystem Restoration, Continuing Authorities Program (CAP) 1135

This study is being conducted under Section 1135 of the Water Resources Development Act (WRDA) of 1986 (P.L. 99-662). Section 1135 projects are part of a larger Continuing Authorities Program (CAP) under which the Secretary of the Army, acting through the Chief of Engineers, is authorized to plan, design, and implement certain types of water resources projects without additional project-specific authorization. The Section 1135 authority allows the United States Army Corps of Engineers (USACE) to modify existing USACE projects to restore the environment and construct new projects to restore areas degraded by existing USACE projects when it is determined that such modifications are feasible, consistent with the authorized project purpose, and will improve the quality of the environment in the public interest. Work under this authority can include modification to the structures and operations of water resources project constructed by USACE or undertake restoration projects at locations where a USACE project has contributed to environmental degradation.

The Section 1135 program is conducted in partnership with a non-federal sponsor (NFS). The USACE and the NFS share the study and implementation costs. The Federal share of planning, design and construction cannot exceed \$10,000,000 per project.

1. PROJECT INFORMATION

a. Project Description

The proposed study at Watsonville Slough is in Santa Cruz County at the mouth of the Pajaro River, where the Pajaro River discharges to the Pacific Ocean. The Pajaro river watershed encompasses more than 1,300 square miles and the lower reach of the Pajaro forms the boundary between Santa Cruz and Monterey Counties in California. The study area is on the inland side adjacent to farmland; while on the seaward side, it is bordered immediately by the Pajaro Dunes Community and then the Pacific Ocean (Figure 1). The Pajaro Dunes Communities (North and South) are located adjacent to the study area and are periodically affected by flooding issues caused by the natural forming barrier breach (sandbar) that forms at the downstream end of the Pajaro River Lagoon, separating the lagoon from the ocean. The specific study planning objectives are to (1) restore tidal marsh and coastal wetland habitat; (2) restore natural vegetation; (3) reduce non-native vegetation; (4) restore a more natural hydrologic regime and connection with tidal flows; (5) restore and improve habitats for federally listed species; (6) allow for more natural processes to decrease the environmental impacts associated with the need to mechanically breach the sandbar; and to (7) increase recreational opportunities and public education near Watsonville Slough.

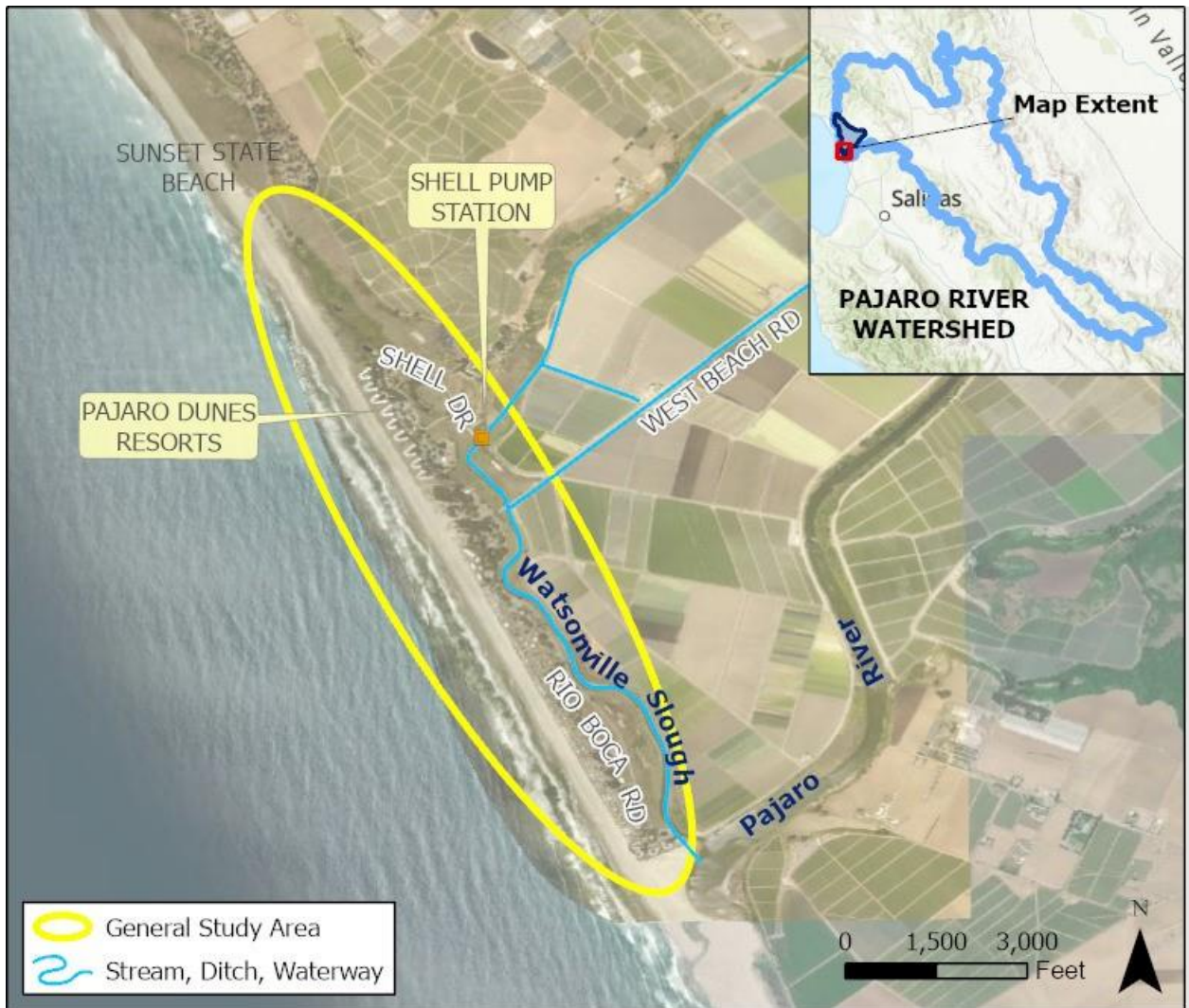


Figure 1. Watsonville Slough Ecosystem Restoration Study Area

b. Factors Affecting the Scope and Level of Review.

- Sea Level Rise: Sea level rise is anticipated to affect the project area and the engineering technical modeling strategy follows USACE guidance related to sea level rise and climate change impacts to inland hydrology (ER 1100-2-8162 and ECB 2018-14, respectively).
- Ecosystem Benefit Model: The PDT has coordinated with ERDC, Eco-PCX, and SPD planning to develop an ecosystem benefit modeling strategy that is appropriate for this project. The model will quantify benefits related to marsh restoration in terms of annual time inundated, which can be linked to the inundation preferences of target vegetation species and show the restoration of hydrology favors target species.
- Alternative Formulation: the PDT will leverage the Institute of Water Resources' (IWR) IWR-Plan software to formulate alternatives from the project's measures. The PDT (including an ERDC wetland scientist) has coordinated this decision with SPD through and In Progress Review (IPR) on 29 June 2022. It is expected that the IWR-Plan is the best equipped at formulating alternatives once the costs and benefits of each measure are known.
- Project Hydrology: Watsonville Slough is a tributary to the Pajaro River Lagoon, a bar-built estuary. Bar-built estuaries are characterized by a wave-built sandbar restricting tidal

connection to the lagoon and upstream areas. This coastal system is also referred to as a coastal river mouth lagoon (referred to as 'lagoon' for short). When the lagoon mouth is closed, the natural backwater stage of the lagoon creates natural flooding, contributing to the hydrology of the marsh plain. As the PDT progressed in the study, it became apparent that lagoon systems are much more complicated than estuaries with permanently open tidal inlets and that the hydraulic modeling necessary to support the project would require more runs to account for the distinct open and closed lagoon mouth states under wet and dry seasons.

A key aspect of the plan formulation for this project is that the closed lagoon mouth state is associated with infrastructure flooding in the project area. Because low infrastructure is flooded during these events, Santa Cruz County mechanically breaches the sandbar, draining the lagoon, earlier than natural processes (e.g., peak streamflows from Pajaro River during an extreme event) would breach, truncating the hydrology of the marsh.

To analyze the hydrologic and ecological benefit of allowing the lagoon to function under more natural hydrologic regime (accomplished by raising a low road crossing), HEC-RAS is modeled for three states: (1) Open lagoon mouth in the wet season; (2) Open lagoon mouth in the dry season and, (3) Closed lagoon mouth. Empirical data is used to determine the percent of the year each lagoon mouth state exists to generate a weighted average of these HEC-RAS results representing the annual inundation across the marsh plain. Forecasting the relative contributions of the lagoon mouth states into the future, both with and without project, requires the application of the Lagoon Quantified Conceptual Model (Lagoon QCM) by the Local Sponsor's consultant, which forecasts the number and length of closure events into the futures with sea level rise.

This technical and planning strategy was affirmed by SPD at the IPR on 29 June 2022 and reaffirmed on 27 Oct 2022 at a meeting with SPD planning. As no models or tools specifically addressing lagoon hydrology and morphology exist with USACE at the time, the PDT pursued a one-time waiver for use of Lagoon QCM to inform future lagoon hydrology conditions and assumptions. The use of the QCM model has been reviewed by Dr. Yan Ding (ERDC) and verbal approval was provided on 24 October 2022. Written approval is expected in December 2022. A description of the model background, scenarios simulated and caveats related to the use of this model will be included in the H&H reporting.

- Stakeholder Involvement: The Watsonville Slough is home to Federally listed species, a robust recreational birding and hiking community, is adjacent to a parking lot used to access a CA State Park public beach, agricultural lands, and the low-lying Beach Road crossing is the only egress and ingress for the Pajaro Dunes South community. With this, the PDT included Federal, state, and local agencies at the planning charettes. The PDT continues to coordinate with resource agencies, stakeholders, and the public and has developed a robust public involvement plan (within the PMP) to help support the project's outreach and coordination needs.
- Road crossing: Preliminary modeling suggests that raising the road crossing will contribute the most benefits of all of the measures because it will allow for more natural hydraulics and allow more areas of the marsh to remain inundated longer each year. The road crossing is also the costliest measure being considered. To mitigate for this risk, the team included a pre-TSP milestone "over the shoulder" DQC for the bridge design. The goal is to have the

cost estimate for the conceptual design be as accurate as possible for early formulation and decision making.

c. In-Kind Contributions.

Products and analyses provided by the non-Federal sponsor as in-kind contributions and are subject to DQC and ATR. The non-Federal sponsor working closely with the PDT in the development of the TSP package and integrated report. They are also developing a planning quantified conceptual model (QCM) to help understand and forecast how the Pajaro Lagoon will respond to rainfall events and what percentage of time the lagoon is in one of the three states; (1) open; (2) partially open; (3) closed. The QCM model is not a certified model and will undergo the appropriate approval process for a one-time use. Please see section 1b for more information.

2. DISTRICT QUALITY CONTROL (DQC)

a. Required DQC Team Expertise.

DQC Disciplines	Expertise Required
Planning	The plan formulation reviewer should have specialized expertise in USACE plan formulation, CAP project planning for ecosystem restoration projects, and be familiar with the “Planning Guidance Notebook” (ER-1105-2-100), CAP planning guidance (EP-1105-2-58) , the Water Resources Council’s Principals and Guidelines, SMART Planning guidance, CE/ICA, and recent planning updates.
Economics	The economics reviewer should be either from the certified list by business line, or for exceptions, be approved as developmental reviewer by the Economics Sub-Community of Practice. The economics reviewer should be a senior economist with experience in ecosystem restoration planning and CE/ICA.
Cultural Resources	The cultural resources reviewer should be a senior water resources archaeologist familiar with California tribes and have USACE experience regarding cultural resources on public and tribal lands.
Environmental Resources	The environmental reviewer should have demonstrated experience in the field of ecosystem restoration, environmental effects analysis of coastal restoration projects, preferably in and around west coast estuaries. The reviewer should be familiar with threatened and endangered species in the area, be up to date on requirements of NEPA, joint NEPA/CEQA documents; Coastal Zone Management Act, Sections 404 (b)(1) Alternatives Analysis under Clean Water Act; Marine Mammal Protection Act; Clean Air Act. The reviewer should be familiar with ecosystem benefit modeling and its contribution to CE/ICA in the development and evaluation of alternatives.
Hydraulics and Hydrology and Coastal Engineering	The hydraulic engineering reviewer will be an expert in the field of coastal engineering, hydrology and hydraulic modeling, and have experience in completing hydraulic modeling and analysis for a coastal storm, flood risk management, and ecosystem restoration project. They should also have expertise in hydrology, coastal geomorphology, lagoon and estuary processes, open channel

	dynamics, application of the USACE sea level rise curves, and operating 2D HEC-RAS hydraulic modeling software. The reviewer will also evaluate the outputs from the QCM modeling. If necessary, SPN engineering will work with the RMO to locate an appropriate reviewer.
Climate Change	The climate reviewer should have expertise in sea level rise and climate change impacts to inland hydrology (ER 1100-2-8162 and ECB 2018-14, respectively).
Cost Engineering	The reviewer should be a cost estimating specialist competent in cost estimating for both construction and ecosystem restoration using MCACES/MII; working knowledge of construction and environmental restoration; capable of making professional determinations based on experience.
Geotechnical Engineering	The reviewer should have recent experience in the Corps' design requirements. This person should also have experience in wetland restoration and the geotechnical design aspects of such project.
Civil Engineering	The reviewer should have experience in the design of coastal wetland restoration features, including road crossing design, channel design, and associated design aspects.
Construction Management	It will be determined through the feasibility study if construction expertise is necessary as construction expertise is often most critical during the design and implementation phase of CAP studies. If needed, the reviewer should have experience with road raise, dewatering, traffic management.
Real Estate	Real Estate reviewers should be senior real estate specialist with experience in standard and non-standard estates common to ecosystem restoration projects.

b. DQC Documentation. DQC reviewers will record substantive comments in DrChecks. Editorial comments are appreciated using tracked changed in the document being reviewed or a separate MSWord or MExcel document. Reviewers will be requested to review the Tentatively Selected Plan read-ahead, the draft Integrated Report, Technical Appendices, as well as the Draft-Final version of all documents. Once comments are addressed and back-checked, USACE management certifies that DQC is complete. DQC documentation will be available for Agency Technical Reviewers (ATR).

3. AGENCY TECHNICAL REVIEW (ATR)

An ATR certification template is attached for future reference.

a. Required ATR Team Expertise:

ATR Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. It is

	preferred that the ATR lead also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc.).
Plan Formulation	The plan formulation reviewer should have experience in USACE plan formulation, CAP project planning for ecosystem restoration projects, and be familiar with the “Planning Guidance Notebook” (ER-1105-2-100), “Continuing Authorities Program” guidance (EP-1105-2-58), the Water Resources Council’s Principals and Guidelines, SMART Planning guidance, and recent planning updates.
Economics	The economics reviewer should be a senior economist with experience in ecosystem restoration planning and CE/ICA.
Environmental Resources	The environmental reviewer should have demonstrated experience in the field of ecosystem restoration, environmental effects analysis of coastal projects, preferably in and around west coast estuaries. The reviewer should be familiar with threatened and endangered species in the area, as well as up to date requirements of NEPA, Joint NEPA/CEQA documents; Coastal Zone Management Act, Sections 404 (b)(1) Alternatives Analysis under Clean Water Act; Marine Mammal Protection Act; Clean Air Act.
Cultural Resources	The cultural resources reviewer should have experience in completing ecosystem restoration and flood risk management studies. An understanding on the significance of the region's precontact archaeological sites, such as shell middens, is needed due to this cultural resource type being situated throughout the study area. The reviewer should also have years of experience in complying with federal environmental and historic preservation law, specifically Section 106 of the National Historic Preservation Act and its implementing regulations under 36 CFR 800 as well as NEPA. Knowledge on USACE’s tribal trust responsibilities and any other regulations tied to coordination with tribes and historic organizations is needed.
Geotechnical Engineering	The reviewer should have recent experience in the Corps’ design requirements. This person should also have experience in wetland restoration and the geotechnical design aspects of such project.
Coastal Engineering/ Hydrologic & Hydraulic Engineering	The hydraulic engineering reviewer will be an expert in the field of coastal engineering, hydrology and hydraulic modeling, and have experience in completing hydraulic modeling and analysis for a coastal storm, flood risk management, and lagoon restoration project. They should also have expertise in hydrology, coastal geomorphology, west coast lagoons and estuary processes, open channel dynamics, climate trends, sea level rise, and the application of the USACE sea level rise curves, and operating 2D HEC-RAS hydraulic modeling software. The reviewer will evaluate the outputs from the lagoon QCM modeling. Review of the model will ensure that the model represents the boundary conditions accurately.
Civil Engineering	The civil reviewer should be a senior water resources civil

	engineer with experience in Civil Works planning and experience in the design of coastal wetland restoration features, including road crossing design, channel design, and associated design aspects.
Cost Engineering	The cost engineering reviewer should be a senior water resources cost engineer with experience in Civil Works planning including Cost Mandatory Center of Expertise (MCX) Staff or Cost MCX Pre-Certified Professional with experience preparing cost estimates for ecosystem restoration projects.
Real Estate	The real estate reviewer should be a senior water resources real estate specialist with experience in Civil Works planning and have a thorough understanding of easements, right of ways, and land acquisition.

4. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

a. Decision on Type I IEPR.

In accordance with Director of Civil Works Memorandum (05 APR 2019), Interim Guidance on Streamlining Independent External Peer Review (IEPR) for Improved Civil Works Product Delivery, the three mandatory conditions determining whether Type I IEPR is undertaken are as follows:

- When the estimated total cost of the project, including mitigation costs, is greater than \$200 million. *Not applicable here.*
- When the Governor of an affected state requests a peer review by independent experts. *Not applicable here.*
- When the Chief of Engineers determines the project study is controversial due to significant public dispute over the size, nature, or effects of the project or the economic or environmental costs or benefits of the project (including but not limited to projects requiring an environmental impact statement (EIS)). *Not applicable here.*

In addition to the above mandatory triggers, Director of Civil Works Memorandum (05 APR 2019) references Section 2034 of WRDA 2007, as amended, which permits project studies that would otherwise require independent peer review to be excluded from such a review under certain circumstances, including if the project study does not include an EIS and is being conducted under the CAP authorities. The Watsonville Slough CAP 1135 Ecosystem restoration study does not meet any of the mandatory triggers for Type I IEPR. The District requests MSC concurrence to forgo Type I IEPR based of this risk-informed assessment.

The decision to forgo Type I IEPR will be reviewed at the TSP Milestone and the TSP MFR will document the MSC's risk-informed assessment of the expected contribution of IEPR and determination that Type I IEPR is not required. Due to the limited scope of this study, it is anticipated that Type I IEPR would not provide substantial benefit to the project. The project is not expected to have significant environmental impacts and will therefore be completing an EA, not an EIS. There is also a low potential for public controversy and complexity. The consequences of non-performance or project failure on project economics, the environmental and social well-being (public safety and social justice) is akin to the Without Project Condition and will be evaluated as part of the Feasibility Study. Additionally, the outcomes of the study are not anticipated to contain influential scientific information or highly influential scientific assessment. No additional action to exclude the study from IEPR is necessary.

b. Required Type I IEPR Panel Expertise.

IEPR Panel Disciplines	Expertise Required
N/A	N/A

c. Anticipated Type II IEPR (Safety Assurance Review (SAR)).

Not Anticipated

5. MODEL CERTIFICATION AND APPROVAL

a. Planning Models.

The following planning models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status	Peer Review Anticipated
Ecological Benefits Models	The ecological benefit model will illustrate the improvements to the ecosystem due to the restoration of more natural marsh hydrology. Existing hydrology on the marsh is impacted by both historic berms between the shoughs and marsh plains that truncate hydrology during low water levels, and manual breaching of the lagoon that truncates hydrology during potential high levels. This truncated hydrology affects marsh plants, stressing them in some places and allowing non-natives to co-dominate where hydrology is. The ecological benefits model will focus on the acreage of marsh plain within a specified range of annual inundation periods preferred by target marsh species. In order to generate these annual inundation periods, HEC-RAS will be used to quantify marsh inundation percentages over short model runs with specific lagoon states (e.g., open lagoon/dry season, open lagoon wet season, closed lagoon). The raster results of these HEC-RAS runs will be combined in a weighted average to reflect the period of time in an average year that the lagoon is in each state, resulting in an annualized inundation map reflecting the inundation plants on the marsh plain experiences over the course of a year. This metric should be sensitive to multiple restoration measures (e.g., berm breaches, side channel excavation, raising of critical infrastructure to alter manual lagoon breach scheduling) that will provide more natural hydrology.	Not necessary for CAP projects. This strategy is supported by the Eco-PCX and SPD Planning.	The use of the model will undergo DQC and ATR will be conducted as part of the regular planning process.
IWR CE/ICA	A cost effectiveness incremental cost analysis is completed through the IWR-Planning Suite to compare the alternatives (or measures) under consideration for the project site. The analysis evaluates the effectiveness and efficiency of the site alternatives at producing	Certified for National use	DQC and ATR reviewers will review inputs and outputs

	environmental outputs in relation to the alternative (or measure) cost and determines the most effective and efficient alternative (or measure) to recommend as the NER plan		
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b. Engineering Models.

The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status	Peer Review Anticipated
HEC-RAS 6.0	Hydraulic Engineering Center’s River Analysis System (HEC-RAS) will be used to create a 2-D model of the project area, including Watsonville Slough, the Pajaro River and lagoon outlet. This model will evaluate water levels and depths, velocities, inundation extents and patterns under no-project and future project conditions.	Certified	No
Quantified Conceptual Model (QCM) of Inlet Morphology and Associated Lagoon Hydrology	The QCM has been calibrated with 10-years of empirical data at the Pajaro Lagoon and predicts the natural cycles of lagoon closure and breaching events caused by wave action, rainfall events, etc. For existing conditions, the percent of time the lagoon is in open and closed states – information required to generate annualized inundation ranges from the weighted average specific HEC-RAS model runs -- can be calculated from empirical data. QCM will inform whether this weighted average shifts in the future when SLR affects the frequency and duration of lagoon closures. Its only role is in informing the weights different HEC-RAS model runs get in generating the annualized inundation metric used for the ecosystem restoration benefit model.	The use of the QCM model has been reviewed by Dr. Yan Ding (ERDC) and verbal approval was provided on 24 October 2022. Written approval received from John Winkelman on 8 Feb 2023 for one time use.	Yes

6. REVIEW SCHEDULE AND COST

Pre-TSP IPRs: 29 June 2022 (actual)
TSP Milestone: 20 April 2023
Release Draft Report: 19 July 2023

a. DQC Schedule and Cost.

- Estimated cost is \$55,000.
- Hydrology Certification: November 2022 (actual)
- TSP RAH including Fact Sheet and Presentation: March-April 2023
- Draft Detailed Project Report and Environmental Assessment: June 2023

b. ATR Schedule and Cost.

- Estimated cost is \$70k.
 - Hydrology Certification: November 2024 (actual)
 - Draft Detailed Project Report and Environmental Assessment: July-August 2023
- c. Planning and Engineering Model Peer Review Schedule and Cost**
- Estimated cost is \$8k.
- d. Type I IEPR Schedule and Cost.** N/A
- e. Type II IEPR (SAR) Schedule and Cost.** N/A

7. PUBLIC AND PARTNER ENGAGEMENT

The PDT has been coordinating with local resource agencies, Tribes, landowners, and other stakeholders working on projects near the project area. In coordination with the Non-Federal Sponsor, the PDT has developed a public involvement plan to ensure there is transparent communication with local resource agencies, Tribes, landowners, and other stakeholders to communities regarding the study process and any known project impacts. Coordination to date has included engagement during the planning charrette process. The team is continuing to meet with local stakeholders to support formulation prior the TSP. The draft report will be released for public comment after the TSP milestone.

8. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following point of contact: Joél Flannery at Joel.R.Flannery@usace.army.mil

9. TEAM ROSTER

Redacted. Please direct public comments to the Project Manager, see paragraph 8.

10. PROJECT FACTSHEET REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

11. DISTRICT CONCURRENCE

District Quality Control (DQC) of the Watsonville Slough Creek CAP 1135 Programmatic Review Plan Execution Sheet has been completed. All comments resulting from DQC review have been resolved.

General Findings

Compliance with clearly established policy principles and procedures, utilizing clearly justified and valid assumptions, has been verified. The undersigned recommend certification of the quality control process for this product.

Certification of District Quality Control Review and Coordination

Certification is hereby given that all quality control activities and coordination appropriate to the level of risk and complexity inherent with the completed product have been completed. All concerns resulting from District Quality Control Review of the project have been fully resolved.

We the undersigned concur in the review plan execution sheet, dated 27 February 2023, for the Watsonville Slough CAP 1135 project.

Tessa Beach, PhD.
San Francisco District Planning Chief

Date

Son Ha, PE
San Francisco District Engineering Chief

Date

ATTACHMENT 1

Sample Statements of Completion and Certification of ATR for Decision Documents

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the review plan for the Watsonville Slough Ecosystem Restoration CAP 1135 project located near Watsonville, CA. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-217. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrCheckssm.

SIGNATURE

Name

ATR Team Leader

Office Symbol/Company

Date

SIGNATURE

Name

Project Manager (home district)

Office Symbol

Date

SIGNATURE

Name

Architect Engineer Firm Project Manager¹

Company, location

Date

SIGNATURE

Name

Review Management Office Representative

Office Symbol

Date

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: [Describe the major technical concerns and their resolution.](#)

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE

Name

Chief, Engineering Division (home district)

Office Symbol

Date

SIGNATURE

Name

Chief, Planning Division (home district)

Office Symbol

Date

¹ Only needed if some portion of the ATR was contracted