# APPENDIX L
# Mitigation Monitoring and Reporting Program

US Army Corps of Engineers
Corte Madera Creek Flood Risk Management Project
October 2018

# APPENDIX L MITIGATION MONITORING AND REPORTING PROGRAM

This Environmental Mitigation Monitoring and Reporting Program (MMRP) has been developed pursuant to Section 21081.6 of the California Environmental Quality Act (CEQA) for the Corte Madera Flood Risk Management Project. The purpose of the MMRP is to ensure compliance with the mitigation measures during project implementation. This MMRP addresses how the mitigation measures will be implemented. Avoidance and minimization measures (AMM) have also been included in this document to ensure implementation and compliance.

The MMRP and AMM matrices identify mitigation measures/AMMs and applicable impacts for the project. The information in both matrices is organized to correspond with environmental issues discussed in Chapter 4 of the EIS/EIR. Information in these matrices is provided in six columns: 1) Significant Impact, 2) Mitigation Measure/AMM, 3) Implementing Party, 4) Monitoring/Reporting Party, 5) Timing, and 6) Monitoring Actions/ Verification of Compliance. These columns are defined below.

**Impact:** Provides a brief description of the impact expected to occur from the proposed Project as identified in the EIR/EIS. Impacts considered in the MMRP matrix were considered significant.

**Mitigation Measure/AMM:** Provides the mitigation measure/AMM and monitoring requirements as identified in the EIR/EIS.

**Implementing Party:** Identifies the entity that will be responsible for directly implementing the mitigation measures/AMMs. Implementation can be the responsibility of the U.S. Army Corps of Engineers (USACE)/ Marin County Flood Control and Water Conservation District (District) or the contractor.

**Monitoring /Reporting Party:** Identifies the entity that will be responsible for directly implementing the monitoring and reporting. Monitoring will generally be the responsibility of the contractor, with oversight provided by USACE/District during construction. Long-term mitigation monitoring responsibilities will be transitioned from the contractor to USACE/Dsitrict upon final contract acceptance.

**Mitigation Timing:** Not all mitigation and AMM actions will occur at the same time. Depending upon the measure, it may be undertaken prior to construction, during construction, or during project operations. Measures may also be undertaken in conjunction with different construction packages or at such time as project operations reach a certain level. This column of the table identifies the stage of the project during which the mitigation or AMM action will be taken and when reporting is to occur, if reporting is required.

**Monitoring Actions/Verification:** Identifies the actions required to implement the measures, including any required agreements and/or conditions, and how the actions will be verified.

For a complete description of potential impacts, recommended mitigation measures, and AMMs, please refer to the specific resource discussions in Chapter 4 of the EIS/EIR.

## MITIGATION MONITORING AND REPORTING PROGRAM MATRIX

| Significant Impact | Mitigation Measure | Responsibility and Method of Compliance | Mitigation Timing |
|---|---|---|---|
| **Geology** | | | |
| **Impact GEO-1:** Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:<br>• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issues by the State Geologist for the area or based on other substantial evidence of a known fault;<br>• Strong seismic ground shaking;<br>• Seismic-related ground failure, including liquefaction;<br>• Landslides | **Mitigation GEO-1:** Geotechnical Oversight- All earthwork and floodwall installation shall be monitored by a licensed geotechnical or soils engineer retained by the USACE and sponsor of all project phases and all off-site elements. The geotechnical or soils engineer shall provide oversight during excavation, placement of fill, construction of floodwalls, and disposal of materials removed from and deposited on the project site to ensure that the design is implemented as intended to minimize significant impacts. | USACE and Marin County to ensure compliance<br><br>Licensed geotechnical or soils engineer to monitor earthwork and floodwall installation and provide oversight | During construction |
| **Biology** | | | |
| **Impact BIO-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. | **Mitigation BIO-1:** USACE and District will plant trees in another area, as agreed in compliance with the Town of Ross and District policies, to replace those trees removed during project construction. All trees to remain during construction within the grading area shall be protected and trimmed if necessary to ensure their trunks and/or limbs are not disturbed during construction. To mitigate for tree removal:<br><br>For each tree to be removed, the District shall plant a replacement tree of the same species or a suitable native species substitute, at a rate of one planting per tree removed or such | USACE and the District to implement planting into design of Allen Park Riparian Corridor or in post-construction efforts<br><br>Arborist or biologist to provide recommendations | Post construction |

## MITIGATION MONITORING AND REPORTING PROGRAM MATRIX

| Significant Impact | Mitigation Measure | Responsibility and Method of Compliance | Mitigation Timing |
|---|---|---|---|
| | other mitigation ratio requirements to be obtained from Marin County and/or Town of Ross recommendations (for heritage or protected trees), and ensure that replacement trees are planted within or in the vicinity of the Project sites to the maximum extent practicable, as follows:<br>1) Trees shall be replaced within the first year after the completion of construction or as soon as possible after construction is completed.<br>2) Selection of replacement sites and installation of replacement plantings shall be supervised by an arborist or biologist with experience in restoration. Irrigation of tree plantings during the initial establishment period shall be provided as deemed necessary by an arborist or biologist. | | |
| **Cultural Resources** | | | |
| **Impact CUL-1:** Cause a substantial adverse change in the significance of a unique archaeological resource or an historical resource as defined in CEQA Guidelines Section 15064.5 or 36 CFR 800.5 of Section 106 of the NRHP.<br><br>**Impact CUL-3:** Cause a substantial adverse change in the significance of a tribal cultural resource. | **Mitigation CUL-1:** Halt work if archaeological or historic resources are discovered during any construction | Contractor to incorporate measures into specifications<br><br>Review and approve contract specifications | During construction |

| MITIGATION MONITORING AND REPORTING PROGRAM MATRIX | | | |
|---|---|---|---|
| **Significant Impact** | **Mitigation Measure** | **Responsibility and Method of Compliance** | **Mitigation Timing** |
| **Impact CUL-2**: Disturb any human remains, including those interred outside of formal cemeteries.<br><br>**Impact CUL-3** | **Mitigation CUL-2:** Halt Work, Notify Coroner. | Contractor to incorporate measures into specifications<br><br>Review and approve contract specifications | During construction |
| **Noise** | | | |
| **Impact NOI-1:** Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.<br><br>**Impact NOI-2**: A substantial temporary or periodic increase in ambient noise levels in the project vicinity, above levels existing without the project. | **Mitigation NOI-1:** Erect sound barriers around work sites that would help prevent propagation of noise to sensitive receptors where feasible. | Contractor to erect sound barriers<br><br>USACE to ensure compliance | During construction |
| **Impact NOI-4:** Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. | **Mitigation NOI-2:** Implement management practices to reduce the effects of vibration, including:<br>• Buffer distances and types of equipment selected to minimize vibration impacts during construction at nearby receptors.<br>• Schedule construction work to reduce the effects of vibration (i.e. limiting simultaneous use of high-vibration causing equipment).<br>• Inform residents and property owners of vibration-generating activity and potential consequences.<br>• Implement a vibration, crack, and line and grade monitoring program at existing | Contractor to incorporate measures into specifications<br><br>USACE to review and approve contract specifications | During construction |

## MITIGATION MONITORING AND REPORTING PROGRAM MATRIX

| Significant Impact | Mitigation Measure | Responsibility and Method of Compliance | Mitigation Timing |
|---|---|---|---|
| | historic buildings located within 25 feet of construction activities:<br>• The construction contractor shall regularly inspect and photograph crack gauges, maintaining records of these inspections to be included in post-construction reporting. Gauges shall be inspected every two weeks, or more frequently during periods of active project actions in close proximity to crack monitors.<br>• If vibration levels exceed the threshold and monitoring or inspection indicates that the project is damaging the building, the historic building shall be provided additional protection or stabilization. | | |
| **Impact NOI-5:** Result in adverse effects on biological resources due to noise or groundborne vibration. | **Mitigation NOI-3:** High-vibration causing equipment (e.g. vibratory pile drivers) should not be used during periods of mating and/or breeding for all special-status species in the study area. | Contractor to incorporate measures into specifications<br><br>USACE to review and approve contract specifications | During construction |
| **Human Health and Safety** | | | |
| **Impact HAZ-5**: Impair implementation of or physically interfere with an adopted emergency response or evacuation plan.<br><br>**Impact TRF-3:** Result in inadequate emergency access. | **Mitigation HAZ-1:** Coordinate with local and regional emergency response services. RVFD and Town of Ross Police would coordinate with local regional emergency response services, such as KFPD to the south of bypass construction and San Anselmo to the north of | USACE/District and contractors to coordinate with response services | During construction |

| MITIGATION MONITORING AND REPORTING PROGRAM MATRIX | | | |
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| **Significant Impact** | **Mitigation Measure** | **Responsibility and Method of Compliance** | **Mitigation Timing** |
| | bypass construction. Coordinating with services on either side of construction activities would ensure that emergency response would not experience significant delays in the area. | | |
| **Transportation** | | | |
| **Impact TRF-1:** Conflict with an applicable plan, ordinance, or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit.<br><br>**Impact TRF-2:** Conflict with an applicable congestion management program, including but not limited to LOS standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways. | **Mitigation TRF-1:** Coordinate with the public during construction. The Town of Ross and construction contractor shall implement traffic management measures to minimize traffic delays and maximize safety along the designated detour routes during project construction. Public coordination would include signage and a project information Web page; traffic controls to minimize delays; and promotion of alternative travel modes. A detour map would be made available to the public, local businesses, and other institutions. Implementation of M-TRF-1 would inform the public of safe routes and potential delays, reducing impacts to traffic. However, construction on Sir Francis Drake Boulevard could still cause congestion or reduced level of service. | Town of Ross and construction contractor shall implement traffic management measures<br><br>USACE to ensure contractor compliance | During construction |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| **Water Quality** | | | |
| **Impact WQ-1** | **AMM-WQ-2:** Fuel Management Plan – Develop and incorporate a Fuel Management Plan. | USACE develop Fuel Management Plan and ensure contractor compliance.<br><br>Contractor to implement Fuel Management Plan. | Prior to construction, During construction |
| **Impact WQ-1** | **AMM-WQ-3:** Turbidity Management Plan - Implement Water Quality and Turbidity Management Plan; plan will include stormwater management. | USACE develop Turbidity Management Plan and ensure contractor compliance.<br><br>Contractor to incorporate Turbidity Management Plan. | Prior to construction, During construction |
| **Impact WQ-1** | **AMM-WQ-5:** Hazardous Spill Plan – Develop and incorporate a Hazardous Spill Plan. | USACE develop Hazardous Spill Plan and ensure contractor compliance.<br><br>Contractor to incorporate Hazardous Spill Plan. | Prior to construction, During construction |
| **Impact WQ-1** | **AMM-WQ-9:** Stormwater Runoff Control – No debris, soil, silt, sand, cement, concrete, or washings thereof, or other construction-related materials or wastes, oil, or petroleum products, or other organic or earthen material shall be allowed to enter into or be placed where it may be washed from the construction sites by rainfall or runoff into waters of the state. | Contractor to include in contract specifications.<br><br>USACE to review and approve contract specifications; ensure contractor compliance. | During construction |

## AVOIDANCE AND MINIMIZATION MEASURES MATRIX

| Impact | AMM | Responsibility and Method of Compliance | AMM Timing |
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| **Impact WQ-1** | **AMM-WQ-10:** Stormwater Management Plan – Stormwater Management Plan will be developed to ensure that, during rain events, construction activities do not increase the levels of erosion and sedimentation. This plan will include the use of erosion-control materials and erosion-control measures to minimize any impacts that may occur due to increased mobilization of sediments. | USACE develop Stormwater Management Plan and ensure contractor compliance.<br><br>Contractor to incorporate Stormwater Management Plan. | Prior to construction, During construction |
| **Impact WQ-1**<br>**Impact AIR-1**<br>**Impact AIR-2**<br>**Impact AIR-3**<br>**Impact AIR-4** | **AMM-WQ-11**: Erosion will be controlled based on the Storm Water Pollution Prevention Plan (SWPPP) to be prepared for the project. Implementing the SWPPP measures will minimize soil erosion and related sedimentation. | USACE develop SWPPP and ensure contractor compliance.<br><br>Contractor to implement SWPPP. | Prior to construction, During construction |
| **Geology** | | | |
| **Impact GEO-1:** Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:<br>• Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issues by the State Geologist for the area or based on other substantial evidence of a known fault<br>• Strong seismic ground shaking<br>• Seismic-related ground failure, including liquefaction;<br>• Landslides | **AMM-GEO-1:** New floodwalls will be designed and constructed to reduce or otherwise account for potential geologic hazards such as ground shaking, liquefaction, settlement, and lateral spreading. Geotechnical investigations will be completed to support project design to ensure that potential geologic hazards will not cause the project to fail.<br>Before construction begins, for all project phases, a final geotechnical subsurface investigation report for the proposed project shall be submitted to the District. The final geotechnical engineering report shall be prepared according to the current California Building Code standards. The geotechnical investigation shall include subsurface testing of soil and groundwater conditions for both on-site and off-site project | A final geotechnical engineering report shall be implemented for of all project phases in compliance with CBC standards.<br><br>USACE will implement recommendations. | Prior to construction |

## AVOIDANCE AND MINIMIZATION MEASURES MATRIX

| Impact | AMM | Responsibility and Method of Compliance | AMM Timing |
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| **Impact GEO-4:** Be located on expansive soil, as defined in Table 18-1-B of the UBC (1994), creating substantial risks to life or property. | elements and shall determine appropriate foundation designs. All recommendations contained in the final geotechnical engineering report shall be implemented by the project applicant(s) of all project phases | | |
| **Biology** | | | |
| **Impact BIO-1:** Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the NMFS, USFWS, and CDFW.<br><br>**Impact BIO-2**: Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the NMFS, USFWS, and CDFW.<br><br>**Impact BIO-3:** Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.<br><br>**Impact BIO-4**: Interfere substantially with the movement of any native | **AMM-BIO-1:** Pre-construction biological clearance surveys shall be performed to minimize impacts on special-status plants or wildlife species and nesting migratory birds excluding salmonids. Minimizing action would be taken if species are found, as described below. Pre-construction surveys would include the following:<br><br>**Nesting Migratory Birds**<br><br>• To the extent feasible, tree removal will take place outside the migratory bird and raptor nesting period (February 1 through August 31 for most birds).<br>• If tree removal or construction must occur during the nesting season, a qualified wildlife biologist will conduct pre-maintenance surveys for raptors and nesting birds within suitable habitat within 300 feet of the worksite. The surveys should be conducted within one week before initiation of activities.<br>• If no active nests are detected during surveys, activities may proceed. If active nests are identified, non-disturbance buffers shall be established at a distance sufficient to minimize disturbance based on the nest | USACE will contract a qualified biologist to conduct surveys and recommend minimizing action if applicable.<br><br>Contractor implements recommended minimizing action.<br><br>USACE will ensure that the contractor implements recommended minimizing action in compliance with the NMFS, USFWS, and CDFW. | Prior to construction |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.<br><br>**Impact BIO-5:** Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance. | location, topography, cover and species' tolerance to disturbance. Buffer size shall be determined in cooperation with the CDFW.<br>• If construction work is resulting in nest disturbance, work shall cease and CDFW shall be contacted.<br><br>**Western Pond Turtle**<br><br>• A qualified biologist shall survey the work site no more than 72 hours before the onset of ground disturbing activities for signs of western pond turtles and/or western pond turtle nesting activity (i.e., recently excavated nests, nest plugs) or nest depredation (partially to fully excavated nest chambers, nest plugs, scattered egg shell remains, egg shell fragments).<br>• Preconstruction surveys to detect western pond turtles should focus on suitable aerial and aquatic basking habitat such as logs, branches, root wads, and riprap, as well as the shoreline and adjacent warm, shallow waters where pond turtles may be present below the water surface beneath algal mats or other protective cover.<br>• Preconstruction surveys to detect western pond turtle nesting activity should be concentrated within suitable aquatic habitat and should focus on areas along south- or west-facing slopes with bare hard-packed clay or silt soils or a sparse vegetation of short grasses or forbs. | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | • If western pond turtles or their nesting sites are found, the biologist shall contact the CDFW to determine whether relocation and/or exclusion buffers and nest enclosures are appropriate.<br>• If the CDFW approves moving the animal, the biologist shall be allowed sufficient time to move the western pond turtle(s) from the work site before work activities begin following guidelines according to USFWS.<br>**Pallid Bat and Hoary Bat**<br>• Prior to construction, a qualified biologist shall survey the trees within the project area and the underside of bridge structures for evidence of bat roosts (e.g., bat guano). If bat roosts are found in trees during pre-construction surveys the roosts shall be flagged and avoided during construction.<br>• If roosts are found in trees or under existing bridges, they shall be removed in April, September, or October in order to avoid the hibernation and maternity seasons. Appropriate exclusion methods shall be used, as needed, during habitat removal.<br>• If bats must be excluded, a qualified biologist shall work with CDFW to determine appropriate exclusion methods based upon the species found and their location within the project area.<br>• If bats are found onsite and the proposed construction cannot be altered to avoid the | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | species, the USACE and sponsor shall work with a qualified biologist and CDFW to determine additional mitigation measures based upon the species present and their specific ecological preferences/requirements.<br>• Pre-construction surveys for roosting bats shall be conducted concurrent with those for land birds. If surveys occur during the daytime, the biologist shall look for presence of bat droppings at likely roost sites (under bridges and trees (in layers of bark, woodpecker holes, and hollow branches). The droppings are black and small, about 4 - 8 millimeters long. Bat droppings crumble into powder when crushed, as they consist of insect remains (in contrast, mouse droppings are sticky when fresh and hard when old). During evening hours bats may be confirmed visually at dusk although species identification cannot be ascertained without the use of sonar recordings and specialized software. If no signs of bats are detected during the pre-construction surveys, avoidance has been achieved and maintenance activities can proceed. | | |

## AVOIDANCE AND MINIMIZATION MEASURES MATRIX

| Impact | AMM | Responsibility and Method of Compliance | AMM Timing |
|---|---|---|---|
| **Impact BIO-1**<br>**Impact BIO-2**<br>**Impact BIO-3**<br>**Impact BIO-4**<br>**Impact BIO-5** | **AMM-BIO-5:** Site Restoration - Exposed soil will be stabilized to prevent erosion and revegetated with native vegetation as soon as feasible after construction is complete.<br>• Revegetation will occur at a ratio of at least 1.5:1 to account for initial mortality of plantings. Revegetation will occur with native species appropriate for site conditions.<br>• If soil moisture is deficient, new vegetation will be supplied with supplemental water until vegetation is firmly established.<br>• Erosion control fabric, hydromulch, or other mechanisms will be applied as appropriate to provide protection to seeds, hold them in place, and help retain moisture.<br>• Revegetation shall be regularly monitored for survival for at least five years or until adequate ground cover and survival is achieved. Monitoring for colonization of invasive species will occur, and eradicated if established. | Contractor to incorporate measures into specifications.<br><br>USACE to review and approve contract specifications. | Post construction |
| **Impact BIO-1**<br>**Impact BIO-2**<br>**Impact BIO-3**<br>**Impact BIO-4**<br>**Impact BIO-5** | **AMM-BIO-6:** Biological Construction Monitoring for non-Salmonids - Biological monitors shall be assigned to the project when working in sensitive areas. The monitors shall be responsible for ensuring that impacts on special-status species, native vegetation, wildlife habitat, or unique resources shall be avoided to the fullest extent possible. Where appropriate, monitors shall flag the boundaries of areas where activities need to be restricted to protect native plants and wildlife | Qualified biologist to conduct monitoring and flag boundaries where necessary, in compliance with NMFS, USFWS, and CDFW. | During construction |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | or special-status species. These restricted areas shall be monitored to ensure their protection during construction. Monitoring would include the following:<br><br>**Northwestern pond turtle**<br><br>• Each day, before maintenance activities begin, the ECC shall make a quick survey for turtles, paying close attention to areas where turtles or burrows had been noted during the pre-construction survey. If turtles are observed, the ECC shall use any means necessary to avoid "take" of these species, including hand removal, installation of fencing, or other measures. The ECC shall assess the likelihood of project impacts to these species and coordinate findings with the USFWS and CDFW to ensure that appropriate protective measures are applied.<br>• At any time during maintenance activities, if a northwestern pond turtle is observed by the ECC, maintenance crew, or other knowledgeable persons, maintenance activities shall stop to avert the avoidable take of these species.<br><br>**Ridgway's rail and California black rail**<br><br>• The following measures apply to all sites in or near salt or brackish marshland and will also serve to protect other tidal-marsh dependent species such as saltmarsh | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | common yellowthroat and San Pablo song sparrow.<br>• When working within 250 ft. of salt or brackish marshland during the period February 1 through August 31, presence for either rail species shall be assumed.<br>• When possible, activities shall be scheduled to occur between September 1 and January 31 to avoid the rail breeding season.<br>• Work shall be scheduled to occur between 8:00 AM and 4:00 PM in order to avoid early morning and late afternoon/evening hours when rails are most active.<br>• Work shall be scheduled to avoid periods of high tides, as the high water reduces the amount of refugial habitat for the rails. No work shall occur near salt marsh habitats within two hours before or after predicted extreme high tides of 6.5 ft. above the National Geodetic Vertical Datum (NGVD), as measured at the Golden Gate Bridge, and adjusted to the timing of local extreme high tide events at the project sites.<br>• Activities shall proceed as quickly as possible to reduce disturbance from noise, dust, etc.<br>• Removal or disturbance of emergent tidal marsh vegetation shall be avoided, and removal or disturbance of vegetation at the tidal marsh/upland interface shall be avoided to provide a buffer of refugial habitat within as wide a swath as possible (3 meter minimum) from the Mean Higher High Water | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | (MHHW) line. If removal is necessary, the work shall be scheduled outside of the breeding season (February 1 - August 31); all vegetation shall be salvaged and retained for replacement after work is completed.<br><br>**Raptors and Wading Birds**<br><br>• Several of the sites are adjacent to suitable habitat for raptors and wading birds. Although none of these species are listed, they are protected by the Migratory Bird Act, and impacts to them shall be minimized.<br>• If work is scheduled to occur between August 31 - January 31 after the nesting season, then avoidance has been achieved and work can proceed; however, to protect late- or second-nesters, the a qualified biologist shall walk the site before work occurs to check for nests and presence of birds at the work site.<br>• During nesting season, (February 1 - September 1), a qualified biologist shall walk the area of proposed activity each day before maintenance activities begin to determine presence of nesting raptors and wading birds. If none are observed, avoidance can be assumed and work can proceed.<br><br>**Landbirds**<br><br>• Many of the project sites are along riparian corridors that potentially support many passerine and non-passerine birds, some of which are seasonal and some of which are | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | year-round residents. These birds are known to occur along Corte Madera Creek, particularly within Unit 4.<br>• Any removal of trees or shrubs, or maintenance activities in the vicinity of active bird nests, could result in nest abandonment, nest failure, or premature fledging. Destruction or disturbance of active nests violates the federal Migratory Bird Treaty Act and California Department of Fish and Game (CDFW) Code.<br>• Avoidance will be achieved if construction activities are scheduled for August 1st to January 31 to avoid the nesting season (February 1 to July 31); however, to protect late- or second-nesters, a qualified biologist shall walk the site before work occurs to check for nests and presence of birds at the work site.<br>• If construction activities are scheduled during the nesting season, then the following AMMs should be followed:<br>• The removal of any trees or shrubs shall occur in August, after the nesting season. If removal of trees or shrubs occurs, or maintenance begins between February 1 and July 31 (includes nesting season for passerine or non-passerine birds, and raptors), a nesting bird survey shall be performed within 14 days prior to the removal or disturbance of potential nesting trees or shrubs. | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | • All trees with active nests shall be flagged and a non-disturbance buffer zone shall be established around the nesting tree, or the site shall be avoided until it has been determined that the young have fledged. Buffer zones typically range between 5090 ft. for passerines and non-passerine land birds. Active nests shall be monitored to determine when the young have fledged and are feeding on their own.<br>• In addition to surveying trees and shrubs for nesting birds, surveys shall be conducted for ground nesting birds by walking narrow transects through the grassland adjacent to the project site within 14 days prior to the commencement of project related activities.<br>• A qualified biologist shall be present at the commencement of construction activities to ensure that nesting birds and sensitive bird species have not inhabited the project site during the window following pre-construction surveys. The biologist shall also review all staging areas to ensure nesting and special-status birds are not present.<br>**Roosting bats**<br>• If bats were detected during the pre-construction survey, and removal of trees, shrubs, or dense ivy is scheduled to occur during bat breeding season, a qualified biologist shall conduct a bat presence-absence survey. If bats are detected, work | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | should be re-scheduled to occur within these dates: March 1 - April 15 and/or September 1 - October 15 in order to avoid the breeding season.<br>• Removal of vegetation where bats have been known to roost shall follow the two- phased removal system: Day 1, in the afternoon, limbs and branches are removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures will be avoided, and only branches or limbs with those features will be removed. Day 2: the entire tree will be removed. | | |
| **Impact BIO-1**<br>**Impact BIO-2**<br>**Impact BIO-3**<br>**Impact BIO-4**<br>**Impact BIO-5** | **AMM-BIO-7:** Environmental Awareness Training - A Worker Environmental Awareness Program (WEAP) shall be prepared, and all construction crews and contractors shall be required to participate in WEAP training prior to starting work on the project. The WEAP training shall include a review of the special-status species and other sensitive resources that could exist in the project area, the locations of sensitive biological resources as well as their legal status and protections, and measures to be implemented for avoidance of these sensitive resources. A record of all personnel trained shall be maintained. Species-specific training would include:<br>• A qualified biologist shall conduct a training session for all construction personnel. At minimum, the training shall include a description of the western pond turtle and | Qualified biologist to conduct training.<br><br>Contractor to receive training and maintain a record of all personnel trained.<br><br>USACE to ensure contractor compliance. | Prior to construction |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
|---|---|---|---|
| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | its aquatic and upland nesting habitat, the general measures to implement to avoid and minimize impacts to habitat in the project area as they relate to the western pond turtle, and the boundaries within which construction activities can take place.<br>• Training sessions shall be given to all workers during bat breeding season to inform them of protective measures, details about the two-phase tree removal protocol, and inform them of when work needs to be stopped and appropriate officials informed of species presence if bats are identified during pre-construction surveys. | | |
| **Impact BIO-1**<br>**Impact BIO-2**<br>**Impact BIO-3**<br>**Impact BIO-4**<br>**Impact BIO-5** | **AMM-BIO-8:** Signing - Interpretive signs prohibiting access to areas that are closed to the public, and indicating the importance of protection of sensitive biological resources, will be placed in key locations, such as along trails near sensitive habitats.<br>• A qualified biologist shall determine the appropriate buffer size, in consultation with CDFW, and delineate the buffer using Environmentally Sensitive Area fencing, pin flags, and yellow caution-tape. The project area shall be delineated with high-visibility temporary orange-colored fence at least 4 feet in height, flagging, or other barriers.<br>• Signs shall be posted that clearly state that construction personnel and equipment will | Qualified (USFWS-approved) biologist to delineate buffers and restricted areas in consultation with CDFW; inspect and maintain fencing daily.<br><br>Contractor to comply with signing.<br><br>USACE to ensure contractor compliance. | Prior to construction, during construction |

## AVOIDANCE AND MINIMIZATION MEASURES MATRIX

| Impact | AMM | Responsibility and Method of Compliance | AMM Timing |
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| | not move outside of the marked area. The fencing shall be inspected by a qualified biologist and maintained daily until project completion. The fencing shall be removed only when all construction equipment is removed from the site. No construction activities shall take place outside the delineated project area.<br>• Buffers shall be established around active migratory bird nests and marked by a qualified biologist using ESA fencing, pin flags, and/or yellow caution tape. The size of the buffer may vary for different species and shall be determined in coordination with CDFW. A buffer zone shall be maintained around all active nest sites until the young have fledged and are foraging independently. In the event that an active nest is found after the completion of preconstruction surveys and after construction begins, all construction activities shall be stopped until a qualified biologist has evaluated the nest and erected the appropriate buffer around it. | | |
| **Impact BIO-1**<br>**Impact BIO-2**<br>**Impact BIO-3**<br>**Impact BIO-4**<br>**Impact BIO-5** | **AMM-BIO-13:** Hazardous Materials Management/Fuel Spill Containment Plan - A hazardous materials management and fuel spill containment plan will be developed prior to construction and given to all contractors and biological monitors working on the project. The plan will require: | USACE to develop Hazardous Materials Management/Fuel Spill Containment Plan; ensure contractor compliance. | Prior to construction |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | • Equipment and materials for cleanup of spill be available on site and that spills and leaks will be cleaned up immediately and disposed of properly. Authorities will be notified of spills as required by 40 CFR 110.<br>• Prior to entering the work site, all field personnel shall be appropriately trained in spill prevention, hazardous material control, and clean-up of accidental spills.<br>• Field personnel shall implement measures to ensure that hazardous materials are properly handled and the quality of water resources is protected by all reasonable means. Preventative measures will be implemented, such as vehicle and equipment staging, cleaning, maintenance, and refueling; and contaminant (including fuel) management and storage.<br>• The agency will perform compliance monitoring. | Contractor to implement Hazardous Materials Management/Fuel Spill Containment Plan. | |
| **Impact BIO-1**<br>**Impact BIO-2**<br>**Impact BIO-3**<br>**Impact BIO-4**<br>**Impact BIO-5** | **AMM-BIO-14:** Salmonid Monitoring - If Coho salmon are observed in the project area during winter months or during preconstruction fish capture and relocation activities, all project activities shall cease and DFW and NMFS shall immediately be notified. If steelhead are determined or presumed to be present in the project site, then the following Avoidance and Minimization Measures shall be implemented:<br>• All in-stream maintenance activities will be restricted to the low-flow period of June 15 | Qualified biologist to conduct monitoring in compliance with NMFS, USFWS, and CDFW. | During construction |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | through October 15. Work above the top of bank or outside of the channel will not be subject to this modified work period.<br>• To minimize turbidity and stress to special-status species, personnel shall avoid walking through stream pools and the thalweg of the channel, and shall instead walk across riffles or outside of the stream bed to access a project site.<br>• No equipment is to be operated from within the active stream channel unless the stream has been dewatered and fish have been relocated by a qualified and permitted biologist.<br>• If anadromous salmonids are present, a fisheries biologist with appropriate licenses and equipment (buckets, aerators, etc.) must be on-site to catch and move fish downstream as dewatering proceeds. Captured fish shall be handled with extreme care and kept in water to the maximum extent possible during relocation activities. All captured fish shall be kept in cool shaded, aerated water protected from excessive noise, jostling, or overcrowding any time they are not in the stream and fish shall not be removed from this water except when released. To avoid predation, the biologist shall have at least two containers and segregate young-of-year fish from larger age-classes and other potential aquatic predators. Captured salmonids will be | | |

| AVOIDANCE AND MINIMIZATION MEASURES MATRIX | | | |
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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | relocated, as soon as possible, to a suitable instream location in which habitat condition are present to allow for adequate survival of transported fish and fish already present. Cofferdams used to divert water shall be constructed with clean river gravel or sand bags and sealed with sheet plastic.<br>• If any salmonids are found dead or injured, the biologist shall contact NMFS biologist Rick Rogers by phone immediately at (707) 578-8552 or the NMFS North Central Coast Office at (707) 575-6050. The purpose of the contact is to review the activities resulting in take and to determine if additional' protective measures are required. All salmonid mortalities shall be retained, placed in an appropriately-sized sealable plastic bag, labeled with the date and location of collection, fork length measured, and frozen as soon as possible. Frozen samples shall be retained by the biologist until specific instructions are provided by NMFS. The biologist may not transfer biological samples to anyone other than the NMFS North Central Coast Office without obtaining prior written approval from the North Central Coast Office, Supervisor of the Protected Resources Division. Any such transfer will be subject to such conditions as NMFS deems appropriate. | | |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | • Intakes and outlets shall be designed to minimize turbidity and the potential to wash contaminants into the stream.<br>• If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 5 millimeters to prevent amphibians from entering the pump system. On salmonid streams, the intake pipe shall be fitted with fish screens meeting CDFW and NOAA Fisheries' criteria to prevent entrainment or impingement of small fish (National Marine Fisheries Service 1997: http://swr.nmfs.noaa.gov/hcdlfishscm.pdf).<br>• A filtration/settling system must be included to reduce downstream turbidity (i.e. filter fabric, turbidity curtain). The selection of an appropriate system is based on the rate of discharge. If feasible, water that is pumped into a pipe shall discharge onto the top of bank into a densely vegetated area, which may require extra hose length.<br>• Once the project work is complete, water shall be slowly released back into the work area to prevent erosion and increased turbidity.<br>• The channel and soil surface shall be restored to its original or design configuration after the work is complete. Any material added to the channel or basin to provide support for the work approved under this provision shall be removed unless | | |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | required for erosion control or habitat enhancement and/or restoration.<br>• For minor actions where the disturbance to construct cofferdams to isolate the work site would be greater than that which would occur in completing the proposed action, measures will be put in place immediately downstream of the work site to capture suspended sediment. This may include installation of silt catchment fences across the drainage or placement of a straw wattle or filter berm of clean river gravel. Silt fences and other non-native materials will be removed from the stream following completion of the activity. Gravel berms may be left in place after breaching, provided they do not impede the stream flow. | | |
| **Cultural Resources** | | | |
| **Impact CUL-1:** Cause a substantial adverse change in the significance of a unique archaeological resource or an historical resource as defined in CEQA Guidelines Section 15064.5 or 36 CFR 800.5 of Section 106 of the NRHP.<br><br>**Impact CUL-2**: Disturb any human remains, including those interred outside of formal cemeteries.<br><br>**Impact CUL-3:** Cause a substantial adverse change in the significance of a tribal cultural resource. | **AMM-CUL-1:** Avoid Cultural Resources Prior to construction, implement a program of subsurface testing where project construction and known sites overlap to determine the potential for impacts. | Qualified archaeologist to conduct subsurface testing; identify appropriate mitigation if necessary.<br><br>USACE to provide oversight | Prior to construction |

## AVOIDANCE AND MINIMIZATION MEASURES MATRIX

| Impact | AMM | Responsibility and Method of Compliance | AMM Timing |
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| **Human Health and Safety** | | | |
| **Impact HAZ-1:** Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.<br><br>**Impact HAZ-2:** Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials<br><br>**Impact HAZ-3:** Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. | **AMM-HAZ-1:** Compliance with Federal, State, and Local Regulations - Compliance with applicable regulations would reduce the potential for accidental release of hazardous materials during construction. The contractor would be required to prepare a SWPPP and Spill Prevention, Control, and Countermeasure Plan that details the contractor's plan to prevent discharge from the construction site into drainage systems, lakes, or rivers. This plan would include best management practices and a spill cleanup plan for implementation at each construction site. | Contractor to incorporate measures into specifications.<br><br>USACE to review and approve contract specifications. | During construction |
| **Impact HAZ-1**<br>**Impact HAZ-2**<br>**Impact HAZ-3**<br><br>**Impact HAZ-5**: Impair implementation of or physically interfere with an adopted emergency response or evacuation plan.<br><br>**Impact HAZ-6**: Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. | **AMM-HAZ-2:** Prepare Health and Safety Plan - A worker health and safety plan would be prepared before the start of construction activities that identifies, at a minimum, all the contaminants that could be encountered during construction activities; all appropriate worker, public health, and environmental protection equipment and procedures to be used during Project activities; emergency response procedures; the most direct route to the nearest hospitals; and a Site Safety Officer. The plan would describe action to be taken should hazardous materials be encountered on site, including protocols for handling hazardous materials and preventing | Contractor to prepare and implement a Health and Safety Plan; incorporate into contract.<br><br>USACE to review and approve plan, contract. | Prior to construction, During construction |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | their spread, and emergency procedures to be taken in the event of a spill. | | |
| **Impact HAZ-4**: Be located on a site which is included in a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment. | **AMM-HAZ-3:** If significant time has elapsed between approval of the document and construction, a second records review would be completed to reduce the risk of encountering a hazardous site during constriction. | USACE to conduct records review. | Prior to construction |
| **Impact HAZ-6:** Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands. | **AMM-HAZ-4:** Implement Fire Prevention Measures - Fire prevention measures will be implemented to reduce the risk of fire from construction equipment.<br>• All earthmoving equipment with internal combustion engines will be equipped with spark arrestor.<br>• During the high fire danger period (April 1 – December 1), work crews will have appropriate fire suppression equipment available at the work site.<br>• On days when fire danger is high and a burn permit is required (as issued by the relevant Air Pollution Control District), flammable materials, including flammable vegetation slash, will be kept at least 10 feet away from any equipment that could produce a spark, fire, or flame.<br>On days when the fire danger is high and a burn permit is required, portable tools powered by gasoline-fueled internal combustion engines will not be used within 25 feet of any flammable materials unless at least one round-point shovel or fire extinguisher is within immediate reach of | Contractor to incorporate measures into specifications.<br><br>USACE to review and approve contract specifications. | |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | the work crew (no more than 25 feet away from the work area). | | |
| **Transportation** | | | |
| **Impact TRF-1**<br>**Impact TRF-2**<br><br>**Impact TRF-3:** The project results in inadequate emergency access.<br><br>**Impact TRF-4**<br>**Impact HAZ-5** | **AMM-TRF-2:** Traffic Control Plan - A Traffic Control Plan will be prepared and submitted to the District Department of Public Works and other local agencies with jurisdiction for review and approval. During construction activities, the Marin County Department of Public Works and the project contractors working on the project shall adhere to all requirements of the Traffic Control Plan. The Traffic Control Plan shall include the following:<br>• The route selection for movement of heavy equipment in the project vicinity shall be coordinated with the Marin County Department of Public Works, Marin County Sheriff's Department, and Police Departments for applicable cities and unincorporated communities (Town of Ross and Kentfield) to minimize traffic and physical road impacts. Truck drivers shall be notified and be required to use the most direct route between the project site and Highway 101.<br>• Heavy equipment transport, material transportation, or exportation to and from the project site shall not occur during weekday commute peak traffic periods and shall be coordinated by the contractor with the Marin County Department of Public Works, Marin County Sheriff's Department, and relevant | USACE and the District would develop a Traffic Control Plan and submit it to Marin County Department of Public Works.<br><br>Marin County Department of Public Works to review and approve Traffic Control Plan.<br><br>Contractor to adhere to Traffic Control Plan in conjunction with Marin County Department of Public Works and other applicable agencies. | Prior to construction, During construction |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| | • The Traffic Control Plan will define the use of flaggers, warning signs, lights, barricades, and cones, etc., according to standard guidelines required by the County and Town of Ross as appropriate. Further, the contractor will maintain the work site, including traffic control, in a safe condition at all times, even outside of normal work hours.<br>• Construction activities completed within public street rights-of-way shall require the use of a traffic control service, and any lane closures or traffic control measures shall be consistent with those published in the California Joint Utility Traffic Control Manual (California Inter-Utility Coordinating Committee 2010). Implementing measures contained within the California Joint Utility Traffic Control Manual would facilitate safe passage of both construction vehicles and private vehicles.<br>• A roadway cleaning program shall be instituted to address debris and mud caused by trucks on Sir Francis Drake Boulevard and other access and haul routes. | | |

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| **Impact** | **AMM** | **Responsibility and Method of Compliance** | **AMM Timing** |
| **Public Services and Utilities** | | | |
| **Impact UTL-2:** Require or result in the construction of new water and/or wastewater treatment facilities, or the expansion of existing facilities, which would cause significant environmental effects.<br>**Impact UTL-3:** Require or result in the construction of new storm water drainage facilities, or the expansion of existing facilities, which would cause significant environmental effects. | **AMM-UTL-1:** Locate Utilities - Contact Underground Service Alert (DigAlert) to mark known utilities and use a subsurface utility locator prior to construction. | Contractor to incorporate measures into specifications.<br><br>USACE to review and approve contract specifications. | Prior to construction |