Draft

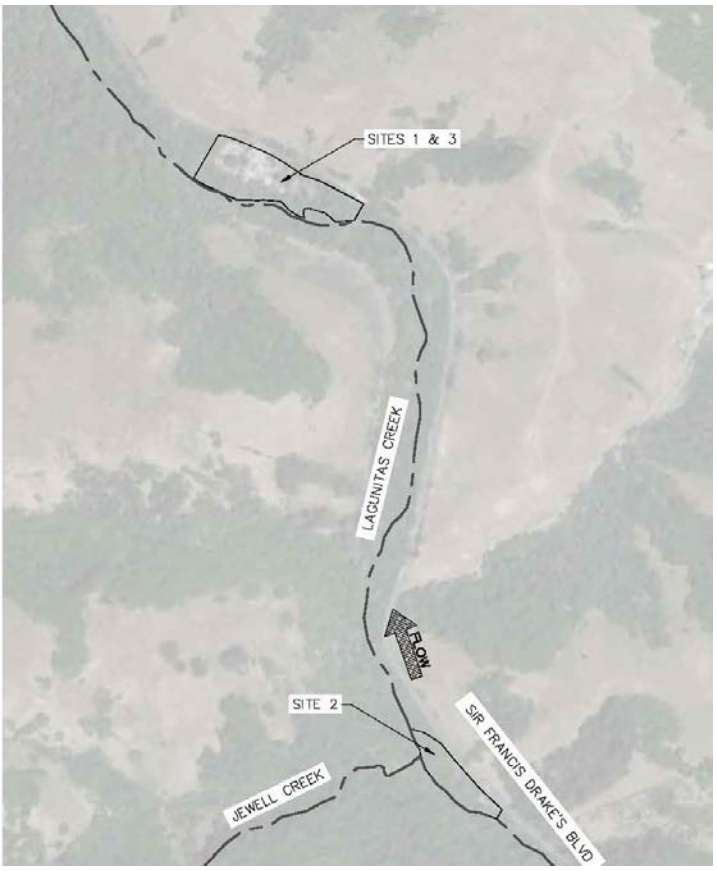
LAGUNITAS CREEK FLOODPLAIN AND RIPARIAN RESTORATION PROJECT

Environmental Assessment and Initial Study/Mitigated Negative Declaration

Prepared for
National Park Service
California State Coastal Conservancy
Salmon Protection and Watershed Network (SPAWN)

January 2018

ESA



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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ACM	asbestos containing materials
APE	Area of Potential Effect
BA	Biological Assessment
BAAQMD	Bay Area Air Quality Management District
BMPs	Best Management Practices
CAL FIRE	California Department of Forestry and Fire Protection
CCC	Central California Coast
CCR	California Code of Regulations
CH	Critical Habitat
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
cfs	cubic feet per second
CFS	California freshwater shrimp
CHHSLs	California human health screening levels
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRGIS	Cultural Resources Geographic Information System
CWA	Clean Water Act
DBH	diameter at breast height
DO	Director's Order
DOT	U.S. Department of Transportation
DTSC	Department of Toxic Substances Control
EA	Environmental Assessment
EFH	Essential Fish Habitat
ESLs	Environmental Screening Levels
ESU	Evolutionary Significant Unit
Fed/OSHA	U.S. Department of Labor Occupational Safety and Health Administration
FEMA	Federal Emergency Management Agency

Acronym	Definition
FESA	Federal Endangered Species Act
FIGR	Federated Indians of Graton Rancheria
FMP	Fisheries Management Plan
GGNRA	Golden Gate National Recreation Area
GHG	greenhouse gases
GMP	General Management Plan
HASP	Health and Safety Plan
HEC-RAS	Hydraulic Engineering Center River Analysis System
HMMP	Hazardous Materials Management Plan
IS	Initial Study
ITP	incidental take permit
LBP	lead-based paints
LWD	large woody debris
MBTA	Migratory Bird Treaty Act
MMWD	Marin Municipal Water District
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NWIC	Northwest Information Center
PEPC	Planning, Environment and Public Comment
PRNS	Point Reyes National Seashore
RCRA	Resource Conservation and Recovery Act
RHA	Rivers and Harbors Act
RWQCB	Regional Water Quality Control Board
SARA	Superfund Amendments and Reauthorization Act
SCC	State Coastal Conservancy
SFBAAB	San Francisco Bay Area Air Basin
SHPO	State Historic Preservation Office
SPAWN	Salmon Protection and Watershed Network
SPT	Samuel P. Taylor State Park
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TCP	Traditional Cultural Property

Acronym	Definition
TMDL	Total Maximum Daily Load
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOCs	volatile organic compounds

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CHAPTER 1
Purpose and Need for Action

1.1 Introduction

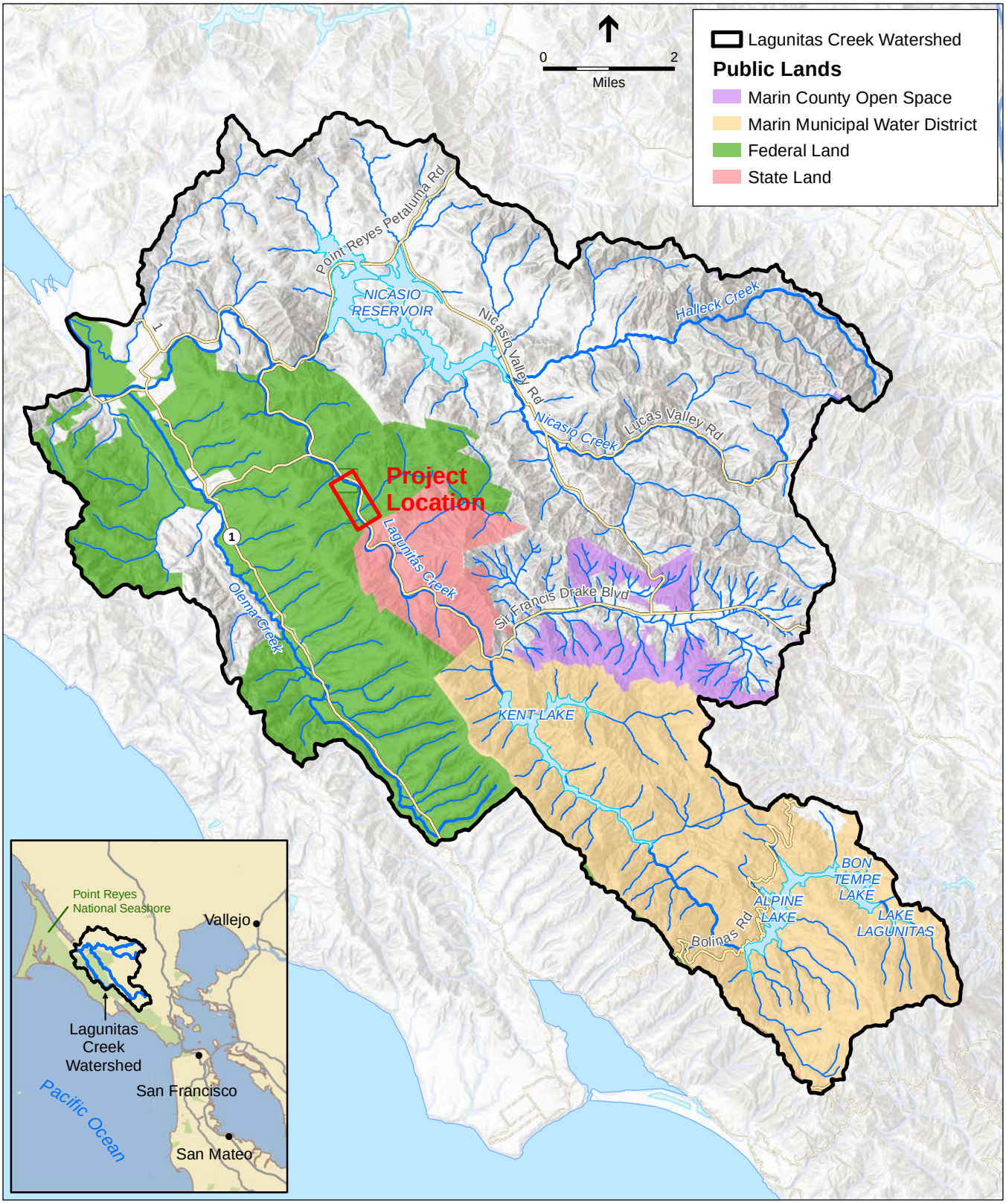
The Salmon Protection and Watershed Network (SPAWN), in cooperation with the National Park Service (NPS), is proposing the Lagunitas Creek Floodplain and Riparian Restoration Project (project). The project consists of modifications to, and restoration of, the Lagunitas Creek floodplain to provide high value off-channel habitat for juvenile salmonids. In addition, modifications to and restoration of the floodplain can be expected to improve geomorphic function and channel form within the creek. The project is located on NPS lands within the north district of Golden Gate National Recreation Area but managed by Point Reyes National Seashore (PRNS).

As landowner, NPS has approval responsibility for the project and is the lead agency for National Environmental Policy Act (NEPA) compliance. The project sponsor, SPAWN, has collaborated with the NPS to prepare this joint Environmental Assessment and Initial Study/Mitigated Negative Declaration (EA and IS/MND) in conformance with NEPA and California Environmental Quality Act (CEQA). The California State Coastal Conservancy (SCC) is the lead agency under CEQA. The SCC has provided funding for project planning and will provide, along with the California Department of Fish and Wildlife and the State Water Resources Control Board, funding for project implementation.

Proposed actions are expected to be implemented in the summer and fall of 2018. If all actions cannot be implemented in one season, then a portion of the actions may be implemented in subsequent seasons.

1.2 Project Location

Lagunitas Creek is located in western Marin County. As the largest watershed in Marin County, the creek flows for approximately 22 miles from its headwaters on Mount Tamalpais to its mouth at the southern tip of Tomales Bay (**Figure 1-1**). The project area is located at Tocaloma and Jewell, unincorporated communities in Marin County, approximately two miles east of the town of Olema. The project includes three sites located within a 32-acre area of land formerly developed for residential housing in the north district of the Golden Gate National Recreation Area (GGNRA), which is managed by Point Reyes National Seashore. The project area is bounded on the east side by Sir Francis Drake Boulevard and on the west by Lagunitas Creek. The downstream limit of the project area is the SPAWN office, located approximately 0.5 mile southeast of Tocaloma, and the upstream limit of the project extends approximately 4,500 feet to the border of Samuel P. Taylor



SOURCE: Marin County

Lagunitas Creek Floodplain and Riparian Restoration Project . 150145

Figure 1-1
Regional Map

State Park (**Figure 1-2**). The project sites have several abandoned residences, old concrete walls and bulkheads, walkways, decks, and other associated hardscape areas.

1.3 Purpose

The purpose of the project is to restore floodplain processes and enhance riparian ecosystem function and habitat for Coho Salmon (*Onchorynchus kisutch*). The overall project goals are to:

1. Enhance winter habitat for the rearing life stage of Coho Salmon
2. Enhance habitat for the spawning life stage of Coho Salmon
3. Protect and enhance habitat, to the extent feasible, for other non-salmonid species such as California freshwater shrimp (*Syncaris pacifica*), Northern spotted owl (*Strix occidentalis*), California red-legged frog (*Rana draytonii*), Pacific lamprey (*Entosphenus tridentatus)* and Western pond turtle (*Clemmys marmorata*)
4. Improve water quality conditions in Lagunitas Creek, implementing actions of the Lagunitas Creek sediment Total Maximum Daily Load (TMDL) Implementation Plan

Restoration and/or rehabilitation of the physical processes that form and maintain critical habitat will allow for achievement of the stated goals. The primary objectives of proposed enhancement actions are to:

1. Emphasize the rearing life stage of Coho Salmon
2. Increase deposition and retention of fine sediments on the floodplain
3. Increase deposition and retention of coarse sediment in the existing main channel
4. Increase the frequency of hydrologic activation of the floodplain for Coho rearing
5. Promote a native riparian corridor that will:
    a. increase the amount of riparian cover (shade)
    b. improve the long term recruitment and supply of woody material
6. Avoid impacts to high quality habitat for identified species of concern
7. Map and delineate existing native bank vegetation that may support special-status wildlife species
8. Improve the existing drainage system adjacent to the creek corridor to promote beneficial stormwater management
9. Remove and/or manage non-native invasive plant species to promote the establishment of native riparian plant species

1.4 Need

The Central California Coast Evolutionarily Significant Unit of Coho Salmon and the Central California Coast Distinct Population Segment of steelhead trout (*Onchorynchus mykiss*) are listed

under the Endangered Species Act as endangered and threatened, respectively, by the National Marine Fisheries Service. Coho and steelhead are both anadromous salmonids that occupy coastal California streams from parts of southern California up into Oregon. Anadromous fish rear at least partially in freshwater, migrate to the ocean as smolts, spend their adult lives in the ocean, and then migrate back into freshwater streams to spawn. Both species have declined significantly throughout their range in California compared to historic numbers (Stillwater Sciences 2008, NMFS 2012 and 2015) with Coho in central California considered to be on the verge of extinction (NMFS 2012). Lagunitas Creek represents one of the largest and most stable populations of Coho Salmon throughout the state. The steelhead population in Lagunitas Creek is considered to be an essential population for the recovery of steelhead in central California (Stillwater Sciences 2008, NMFS 2015). In addition, Lagunitas Creek supports a robust population of the federally listed endangered California freshwater shrimp. Of the roughly 20 streams known to support California freshwater shrimp throughout its limited range of only Marin, Sonoma, and Napa Counties, Lagunitas Creek has been the highest rated stream for its abundance and distribution of shrimp (USFWS 1998). It is also the only stream where the shrimp occur on protected lands.

Within freshwater streams, Coho Salmon require adequate, year-round stream flows, cold water, streamside shade, instream and off-stream shelter and pools, and access to spawning gravels with a low fine sediment component. Previous studies of the Lagunitas Creek watershed have documented winter habitat as the limiting factor for both Coho Salmon and steelhead. Both juvenile Coho Salmon and steelhead suffer the most concentrated population declines between fall and spring annually, with Coho declines being the most dramatic. An analysis of the Lagunitas Creek watershed completed in 2008 showed that limited juvenile winter habitat carrying capacity was the most likely reason for such declines (Stillwater Sciences, 2008). Enhancing winter habitat for these species is identified as the highest priority conservation action in the Lagunitas Creek watershed (Kamman HE Inc., 2013). Additionally, protection and restoration of habitat to support California freshwater shrimp, California red-legged frog, and other endangered and threated species that occur in the watershed is a high priority for the NPS.

This reach of Lagunitas Creek has been identified as an opportunity to restore high value off-channel habitat for juvenile salmonids. In addition, modifications to and restoration of the floodplain is expected to improve geomorphic function and channel form within the creek. This reach of Lagunitas Creek has also been identified in the Lagunitas Creek sediment TMDL as a high priority area for achieving the goals listed in the TMDL.

The actions proposed by this project that help achieve the goals of the TMDL are designed to control sediment discharges, increase the volume and distribution of large woody debris (LWD), and enhance stream-riparian habitat complexity and floodplain connectivity in order to attain allocations and achieve numeric targets for sedimentation and habitat conditions (RWQCB, 2015).

Source: Infrastructure (Marin County);
Culverts (SPAWN and ESA 2014); Aerial Image (NAIP 2012)

Lagunitas Creek Floodplain and Riparian Restoration Project

Figure 1-2
Project Sites

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Significant areas of floodplain that can provide crucial habitat for Coho and other salmonids when restored exist within the identified study area. Functioning floodplains provide critical rearing habitat during typical seasonal flows and also provide high flow refugia during high flow storm events.

The project is needed to address these high priority conservation actions in the Lagunitas Creek watershed.

1.5 Background

An historical review of the Tocaloma/Jewell reach area (project site) developed by SPAWN found that the Coast Miwok originally inhabited the area described as the 'Tocaloma reach' (ESA & SPAWN, 2016). Following initial explorations in the late 1500s, permanent Spanish settlement in Marin County was achieved with the establishment of Mission San Rafael in 1817. During the Mexican Period (1821-1848), the land within Marin County was divided into several ranchos and the project site was within the Rancho Nicasio. During the early American period (1849-1900), a railroad was constructed, which operated from 1875 until 1947. Anecdotal information suggests that the Tocaloma floodplain was used as pasture (Kamman HE Inc., 2013). However, little is known about the specific 32-acre project site prior to the 1930s.

A group of 12 summer homes was built in the Jewell and Tocaloma areas in the 1930s to the early 1940s on the land between Sir Francis Drake Blvd and Lagunitas Creek. The properties transformed the natural site conditions, including alterations to the creek and floodplain, and placement of roughly 150,000 cubic yards of fill across these properties (ESA & SPAWN, 2016). The NPS acquired most of these properties in the early 1980s, leasing the parcels back to local residents until the Reservations of Use expired in the early 2000s. In 2005, many of these structures were flooded by Lagunitas Creek. In 2016, the NPS removed hazardous and abandoned residential structures from seven of the properties in Jewell and Tocaloma. Today, with the exception of the SPAWN offices, all the buildings that were formerly abandoned have been removed by the NPS.

The Lagunitas Creek floodplain at Tocaloma/Jewell has been impacted by the historical residential development and other land uses. The project reach contains eight existing buildings and a native plant nursery that are currently authorized for use by SPAWN and Turtle Island Restoration Network (TIRN). Other hardscape features remaining from previously removed buildings include: old concrete walls and bulkheads, walkways, decks, and other associated hardscape areas. These features have increased and modified local runoff, reduced infiltration and disrupted natural hydrologic and geomorphic processes in the area. Over time, non-native vegetation has established throughout the parcels, compromising native vegetation and thereby degrading terrestrial and aquatic habitat values.

1.6 Scope of the Environmental Assessment

The decision that will be made as a result of this analysis is focused solely on the actions described in Chapter 2, Alternatives. The EA fully describes project alternatives, existing conditions in the project area, and equally analyzes the effects of each project alternative on the

environment. The scope of the project is to analyze actions to restore natural hydrological processes for natural resources. Other habitat enhancement projects are planned in the Lagunitas Creek watershed, including two floodplain enhancement projects downstream from Tocaloma that are sponsored by the Marin Municipal Water District. According to NEPA, the project is considered to have "independent utility" and can be implemented with or without the implementation of other habitat enhancement projects within the Lagunitas Creek watershed.

1.7 Related Laws/Legislation and Other Planning and Management Documents

This document has been prepared by SPAWN and Environmental Science Associates (ESA) in consultation with NPS and SCC to satisfy the requirements of federal and State environmental laws and policies, primarily NEPA and CEQA. The following is a summary of relevant guidance documents and regulations and a description of their relationship to the proposed project. Other applicable regulations, plans, and standards that were considered in developing this EA and analyzing impacts are discussed in individual resource topic areas in Chapter 3, Environmental Consequences.

1.7.1 National Environmental Policy Act

This EA was prepared pursuant to NEPA (42 United States Code [USC] §4341 et seq.), as amended in 1975 by Public Law (PL) 94-52 and PL 94.83. Additional guidance includes NPS Director's Order 12, which implements Section 102(2) of NEPA and the regulations established by the Council on Environmental Quality (40 Code of Federal Regulation [CFR] §1500-1508). The proposed project must comply with the requirements of NEPA as well as other legislation that governs land use, natural resource protection, and other policy issues within National Park Service lands.

An EA is a study required by NEPA to determine whether a proposed federal action has the potential to cause significant environmental impacts. An EA is a decision-making tool that analyzes the potential environmental effects of a proposed action - in this case, the Lagunitas Creek Floodplain and Riparian Restoration Project.

1.7.2 California Environmental Quality Act

The CEQA statute, California Public Resources Code §21000 et seq., codifies a statewide policy of environmental protection. The Initial Study (IS), included in Chapter 4, has been prepared in compliance with the State CEQA Guidelines (California Code of Regulations [CCR] §15000 et seq.). The proposed project has also been evaluated according to State and local requirements including, but not limited to, the California Endangered Species Act and regional air and water quality standards. The IS also identifies measures that have been incorporated into the design of the project to reduce all project impacts to a less than significant level as defined by CEQA Guidelines §15065.

1.7.3 National Park Service Organic Act

The NPS Organic Act directs the NPS to manage units "to conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such a manner as will leave them unimpaired for the enjoyment of future generations." (54 U.S.C. 100101(a), 100301 et seq.). Congress reiterated this mandate in the Redwood National Park Expansion Act of 1978 by stating that the NPS must conduct its actions in a manner that will ensure no "derogation of the values and purposes for which these various areas have been established, except as may have been or shall be directly and specifically provided by Congress." (54 U.S.C. 100101(a), 100301 et seq.). The Organic Act prohibits actions that permanently impair park resources unless a law directly and specifically allows for the acts. An action constitutes an impairment when its impacts "harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources and values." (Management Policies 1.4.3)

1.7.4 National Park Service Management Policies (2006)

The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. This mandate is independent of the separate prohibition on impairment and applies all the time with respect to all park resources and values, even when there is no risk that any park resources or values may be impaired. NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values. However, the laws do give the NPS the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, so long as the impact does not constitute impairment of the affected resources and values. (Management Policies 1.4.3).

1.7.5 General Management Plan for the Point Reyes National Seashore (1980)

Point Reyes National Seashore (PRNS) manages the GGNRA lands under the GGNRA General Management Plan (GMP) objectives. The 1980 GMP covers both GGNRA and PRNS. PRNS has initiated a GMP Amendment process, which will include most of the lands adjacent to the project area.

The following management objectives for Golden Gate National Recreation Area are relevant to this evaluation:

1. To maintain and restore the character of natural environment lands by maintaining the diversity of native park plant and animal life, identifying and protecting threatened and endangered plant and animal species, marine mammals, and other sensitive natural resources, controlling exotic plants, and checking erosion whenever feasible.

1.7.6 National Park Service Director's Order 12 and Handbook

Director's Order 12 (DO-12) prescribes NPS-specific requirements for NEPA analysis, including analyzing a full range of reasonable alternatives, and analyzing impacts to park resources in terms of their context, duration, and intensity.

1.7.7 National Park Service Executive Order 11990, Protection of Wetlands, and Director's Order 77-1, Wetland Protection

The NPS is guided to protect wetlands in accordance with Executive Order 11990, Protection of Wetlands and Director's Order (DO) 77-1, Wetland Protection. DO-77 directs the NPS to a) avoid adverse wetland impacts to the extent practicable, b) minimize impacts that could not be avoided, and c) compensate for remaining unavoidable adverse wetland impacts via restoration of degraded wetlands. DO-77 also directs the NPS to prepare a "Statement of Findings" that describes and provides rationale for adverse impacts to wetlands. However, because the proposed project is considered a restoration project with beneficial affects to wetland resources, a Statement of Findings is not required (exempted). Consistent with DO 77-1 Statement of Findings exemption, the project will implement the Best Management Practices (BMPs) found in Procedural Manual 77-1: Wetland Protection (NPS, 2016). The list of BMPs is included in **Appendix A**.

1.7.8 National Park Service Executive Order 11988 and Director's Order 77-2 for Floodplain Management

Executive Order 11988, "Floodplain Management" (May 28, 1980), was issued "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The goals of the project are in accordance with both the Executive Order and Director's Order to protect and preserve the natural resources and functions of floodplains and restore natural floodplain values previously affected by land use. Similarly, as stated above, this project is exempt from preparing a "Floodplain" Statement of Findings because the project does not propose to add any structures to the floodplain or adversely modify the creek channel and would beneficially improve the floodplain function.

1.7.9 National Historic Preservation Act, Section 106

Section 106 of the National Historic Preservation Act (NHPA) of 1966 requires federal agencies to consider the effects of their undertakings on properties listed or potentially eligible for listing on the National Register of Historic Places. All actions affecting the parks' cultural resources must comply with this legislation.

1.7.10 Central California Coast Coho Salmon Recovery Plan

In 2012, the National Oceanic and Atmospheric Administration Fisheries division published the Central California Coast Coho Salmon Recovery Plan. The proposed project adheres to this Recovery Plan, which is based on the biological needs of the fish and provides the foundation for restoring the populations to healthy levels. The Recovery Plan summarized 27 habitats in Northern California and ranked conditions and threats for each life stage. The plan presented recommendations for Lagunitas Creek that have been included in the proposed project, including:

1. Increasing large wood frequency throughout the watershed to improve conditions for adults and winter/summer rearing juveniles
2. Developing floodplain enhancement and large woody debris projects in modified and incised channel areas of major tributaries
3. Conduct rehabilitation activities that restore channels, floodplains, and meadows to extend the duration of the summer flow and provide refuge from high winter flows

1.7.11 Lagunitas Creek Watershed Sediment TMDL

In 2015, pursuant to federal Clean Water Act section 303(d) and California Water Code section 13242, the San Francisco Bay Regional Water Quality Control Board (RWQCB) established a sediment TMDL for the Lagunitas Creek watershed to address impacts of excess erosion and sedimentation on freshwater wildlife habitat, fish spawning, and recreation (RWQCB 2015). The TMDL establishes numeric targets to limit the allowable amount of sediment discharged into the watershed. The TMDL also includes a habitat enhancement plan to restore, protect, and enhance habitat for Coho Salmon, steelhead, California freshwater shrimp and other aquatic wildlife species. The proposed project will contribute to meeting the TMDL goals by restoring floodplain features that will encourage sediment deposition and enhance riparian habitat to support aquatic species.

1.8 Scoping and Public Involvement

Scoping is an early and open process to determine the breadth of environmental issues and alternatives to be addressed in a planning document prepared in accordance with NEPA. Scoping includes obtaining early input about the planning project from any members of the public, staff, interested agency, or any agency with jurisdiction by law or expertise. Scoping activities for this project are summarized below.

1.8.1 Public Involvement

NPS and SPAWN presented the project at a public meeting of the Lagunitas Creek Technical Advisory Committee (TAC) on March 5, 2015 at the Red Barn classroom at the Point Reyes National Seashore, to describe and answer questions regarding the Project. The project was also presented at the National Park Service Internal Scoping meeting on March 5, 2015. Input received at that meeting was applied to the project.

Public scoping was conducted for a 30-day period from March 24, 2017 to April 24, 2017.The NPS distributed a scoping letter out to approximately 300 addresses on March 24, 2017. Interested parties were encouraged to provide comment on the proposed project. Further, NPS and SCC sent out consultation letters to State and federal agencies with regulatory or review authority over the potentially affected resources to specifically solicit their comments regarding the proposed project. Comments were invited from the public through the NPS Planning, Environment and Public Comment (PEPC) website and hardcopy comments were accepted by U.S. mail or dropped off at the park office. During the scoping period, one comment was received from an individual and one comment was received from an organization. The comments provided by the public during the scoping process are summarized below by general topic. All comments submitted during the project scoping are included in **Appendix B**.

1. Support for the removal of all structures including unoccupied/abandoned and currently occupied structures on federal lands so that the creek can be restored
2. Support for habitat restoration on public lands
3. Support for continued presentations at the Lagunitas Technical Advisory Committee
4. Support for the removal of cabins, berms and levees
5. Support for public participation in the rehabilitation of Lagunitas Creek

1.8.2 Issues and Concerns

The following issues were identified during the scoping process with NPS staff, the public, agencies, and NPS partners:

6. Enhance Coho winter rearing habitat by creation of functional floodplain habitat
7. Potential impacts to endangered California freshwater shrimp
8. Encourage floodplain sedimentation to achieve TMDL goals
9. Project effects on Sir Francis Drake Boulevard
10. Potential for channel avulsion
11. Downstream project effects in consideration of existing bridge abutments immediately downstream from the project site
12. Removal of Japanese knotweed
13. Disposal of excavated material
14. Expressed desire to eventually remove all structures at the site, albeit under the scope of a different project at a different time

1.9 Impact Topics

Impact topics are the resources or values of concern that could be affected, either beneficially or adversely, by the implementing the proposed project. Impact topics that are given further analysis

in Chapter 3, Environmental Consequences are significant issues that play a key role in making a decision on the project. Other issues that arise from project implementation but that are not of critical importance are addressed in Section 1.10, Impact Topics Considered but Dismissed from Further Analysis. The following impact topics were identified based on federal laws, regulations, orders, NPS Management Policies 2006, scoping, and NPS staff concerns or knowledge. The following impact topics are analyzed in this EA:

1. Soils and Water Resources
2. Special-Status Species
3. Vegetation
4. Wildlife
5. Cultural Resources
6. Hazardous Materials
7. Transportation

A description of the existing conditions for each selected topic is provided in Chapter 3, Environmental Consequences.

1.10 Impact Topics Considered but Dismissed from Further Analysis

As part of the scoping and environmental analysis conducted for the proposed project, the following environmental resources and issues were considered but no potential for adverse impacts was identified or the following environmental resources and issues are not relevant to the proposed project. Consequently, there is no further analysis regarding the topics listed below in this EA. Rationale for dismissing specific topics from further review are included below.

1. **Farmlands/Timberlands** – All land in the project area is zoned as public parklands. The proposed project would not convert existing farmland to non-agricultural use. Therefore, the action alternatives would not affect prime or unique agricultural or timber lands.

2. **Adjacent Land Use/Gateway Communities –** National parks can play an important economic role for local communities. Gateway communities are communities in proximity to national parks that provide food, lodging, transportation and other business support for visitors, and act as portals to national park landscapes. The Point Reyes National Seashore is located approximately 30 miles north of San Francisco, and is "a major source of economic activity in Marin County and one of the largest generators of economic activity in West Marin County" (Bay Area Economics 2006). Proposed improvements to the project site are not expected to affect the economics of Marin County or the Bay Area, as there would be no changes to food, lodging, transportation, and other visitor services.

3. **Visitor Experience and Recreation** – Recreational resources in the region surrounding the project include Golden Gate National Recreation Area (GGNRA), Point Reyes National Seashore, and Samuel P. Taylor State Park. Public entrances to these recreational areas are not located in the vicinity of the project area. The GGNRA includes public trails in the project vicinity. The Cross Marin Trail runs approximately 250 feet south of the project site on the south side of Lagunitas Creek and the Jewell Trail is approximately 2,500 feet south of Site 2. Potential impacts on visitor experience and recreation were examined through an assessment of potential changes in access to park uses and potential change in quality of visitors' experiences within the project vicinity. There would be no direct effect on trails

resulting from the project, nor would the project displace trail use resulting in deterioration of other nearby trail facilities. While there may be temporary disturbance of some access routes due to overlap with truck haul routes, there are multiple public access routes such that no access point would be overused and thus would not result in physical deterioration of those areas. Temporary construction impacts related to noise and visual resources would not impact recreationists due to the distance of recreational uses from the site. Further, the project would not result in any loss of recreational uses. Overall, the project would result in a negligible to minor adverse effect on visitor experience and recreation during the temporary construction period. Therefore, this topic was dismissed from further analysis.

4. **Environmental Justice** – Executive Order 12898 requires that all federal agencies evaluate the impact of proposed actions on minority or low-income communities. According to the U.S. Environmental Protection Agency (USEPA) Office of Environmental Justice, environmental justice is the "fair treatment of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws. Fair treatment means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, municipal, and commercial operations or the execution of federal, state, local, and tribal programs and policies." For environmental justice impacts to occur, significant environmental impacts attributable to a project must fall disproportionately upon environmental justice populations within the affected area. The proposed project would not have disproportionate health or environmental effects on minorities or low-income populations or communities as defined in the USEPA's Environmental Justice Guidance (1998). As described under visitor experience, because of its remote location, the project would not impact any visitor use or experience within the PRNS and therefore, there would be no disproportionately affected members of environmental justice populations.

5. **Socioeconomic Resources –** The proposed project would not contribute to the local economy and would have no impacts on socioeconomic resources, including gateway communities and employment.

6. **Park Operations and Management –** Parks must consider the potential effects of proposed actions on overall park operations. Because this is a short-term construction project that would be managed by SPAWN, this project would not significantly affect NPS operations and management. The construction contractor would be responsible for any damage to park facilities (including trails) that occurs as a result of construction activities.

7. **Night Sky –** NPS Management Policies 2006 direct NPS to "preserve, to the greatest extent possible, the natural lightscapes of parks, which are natural resources and values that exist in the absence of human-caused light." Natural darkness or "night skies" can be impacted by artificial lighting. The proposed project would have no impacts to night skies, particularly because construction would occur only during daylight hours.

8. **Air Quality –** During restoration, off-road equipment would be used to remove hardscape features and excess soil from the site. This equipment generates emissions that include several criteria pollutants: ozone precursors, carbon monoxide, and particulate matter. The San Francisco Bay Area Air Basin (SFBAAB) is designated as marginal - nonattainment for the national ozone standard, moderate – nonattainment for the national fine particulate matter ($PM_{2.5}$) standard, and attainment-maintenance area for the national carbon monoxide standard. The Federal *de minimis* thresholds for these pollutants are 50 tons per year for ozone precursors (reactive organic gases and oxides of nitrogen), and 100 tons per year for carbon monoxide and $PM_{2.5}$.

Table 1-1 shows the emissions that would be generated during restoration. These emissions were estimated with project-specific data, which included the type and number of construction equipment to be used and the maximum acreage that would be disturbed.

TABLE 1-1
ANNUAL RESTORATION EMISSIONS (TONS PER YEAR)[a]

Restoration Year	ROG	NO_x	$PM_{2.5}$	CO
2018	0.3	3.0	0.6	1.6
Federal *de minimis* Thresholds	50	50	100	100
Significant (Yes or No)?	No	No	No	No

NOTES:
ROG = Reactive Organic Gas
NOx = Nitrogen Oxides
$PM_{2.5}$ = fine Particulate Matter 2.5 micrometers
CO = Carbon Monoxide

[a] Emissions include results modeled with CalEEMod, version 2016.3.1. Additional data and assumptions are described in **Appendix C**.

As shown in Table 1-1, the project's criteria pollutant emissions in 2018 would be substantially less than the Federal *de minimis* significance thresholds. In addition, the project does not include long-term activities that would generate air pollutant emissions after 2018. Thus, the project would have a negligible effect on air quality within the SFBAAB. As such, this topic was dismissed from further analysis.

9. **Indian Trust Resources –** Department of Interior Compliance Memorandum 95-2 requires the NPS to address environmental impacts of its proposed actions on Indian trust resources. Indian trust resources are those assets owned by Native Americans but held in trust by the United States. Since the lands in the Project area are not trust resources, this topic was dismissed from further analysis.

10. **Climate Change –** The proposed restoration activities within the project area would result in temporary emissions of greenhouse gas (GHG) due to the use of off-road equipment. Criteria pollutant emissions were modeled using the California Emissions Estimator Model (CalEEMod) (version 2016.3.1) software with project-specific data (e.g., construction equipment types and number requirements, maximum daily acreage disturbed) provided in Chapter 2 of this report. Modeling results indicate that project restoration would generate an estimated 315 metric tons CO_{2e} in 2018. Since annual GHG emissions would not exceed the Bay Area Air Quality Management District (BAAQMD) GHG annual significance threshold of 1,100 metric tons carbon dioxide equivalents (CO_{2e}) operational GHG threshold, this topic was dismissed from further analysis.

11. **Soundscape –** Restoration activities would generate noise in the project vicinity. Restoration-related noise sources would include the use of off-road equipment to demolish and remove buried remnants of structures in a portion of the project site, haul trips to transport excess soil and materials from the project site and the use of power tools to clear vegetation. Restoration activities are expected to occur over a three-month period, be intermittent, and only occur during the daytime hours. After restoration is complete, noise levels in the vicinity of the project site would return to their pre-existing levels. Any additional traffic would only be temporary and would negligibly affect local short-term noise levels. Since this project would

have no measurable impact on the long-term soundscape in the project area, this topic was dismissed from further analysis.

12. **Wilderness –** No designated wilderness is located within or near the Project site (Wilderness.net, 2017). Therefore, the Project and alternatives could have no impact on designated wilderness, and this resource is not discussed further.

13. **Wild and Scenic Rivers –** The Wild and Scenic Rivers Act of 1968 established the national wild and scenic river system to protect the nation's highest quality natural rivers. No federal or state-designated Wild and Scenic Rivers or Study Rivers are located within or near the Project site (Caltrans, 2013). Therefore, the project and alternatives could have no effect on designated rivers, and these resources are not discussed further.

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CHAPTER 2
Alternatives

2.1 Introduction

The NPS NEPA Handbook (NPS, 2015) directs the agency to take a "hard look" at alternatives that meet the purpose and need for action and their potential effects on the environment if implemented. This chapter describes the alternatives considered, including the No Action Alternative, the Proposed Action, and action alternative. This chapter also presents a description of alternatives considered in the process but eliminated from further evaluation and why they were eliminated.

2.2 Description of Alternatives

2.2.1 Alternative Development Process

The alternatives were evaluated through an internal planning process that included careful review and analysis of site data, agency management objectives, and input received during scoping. An action alternative and a no action alternative were developed for the project. Alternative A, the action alternative, would improve the quality and resilience of aquatic and terrestrial habitat by enhancing the overall channel and floodplain function at three sites along Lagunitas Creek through expanding and lowering the floodplain, stabilizing the channel bank, increasing large wood loading, and revegetation. In comparison, under Alternative B, the no action alternative, the existing hardscape footings and foundations would remain at Sites 1 and 2, and the three sites would be left to naturally evolve over time without the earthwork and floodplain restoration described in Alternative A. The existing conditions of Site 1 is shown in **Figure 2-1**, the existing conditions of Site 2 is shown in **Figure 2-2**, and the existing conditions of Site 3 is shown in **Figure 2-3**. Alternative B was not selected as the Agency Preferred Alternative because it does not meet the project purpose and need to enhance Coho Salmon rearing and spawning habitat for the conservation of Central Coast Coho Salmon, which are listed as Endangered under the Endangered Species Act. Alternative A was selected as the Agency Preferred Alternative and was designed to meet the project's purpose, need, and objectives as described in Chapter 1, *Purpose and Need for Action*.

Baseline data reviewed to develop the alternatives included the site feasibility study conducted in 2015 (ESA and SPAWN, 2016) to characterize existing conditions and identify opportunities and constraints for site restoration and enhancement. A series of site assessments were conducted and the data was evaluated to identify six enhancement actions to be implemented on three restoration sites. The site assessments are included in the feasibility study (ESA and SPAWN, 2016). The

enhancement actions identified in the feasibility study were developed to meet enhancement actions identified in the Central California Coast Coho Recovery Plan (NMFS, 2012).

To identify which enhancement actions to apply to the three restoration sites, an analysis of five project considerations was conducted: spatial benefit, sustainability, cost, permitting effort, and level of addressing limiting factors for Coho salmon. The analysis results were incorporated into development of enhancement actions for the three sites under the project. Each site is described below and proposed actions in each site are presented with the project alternatives.

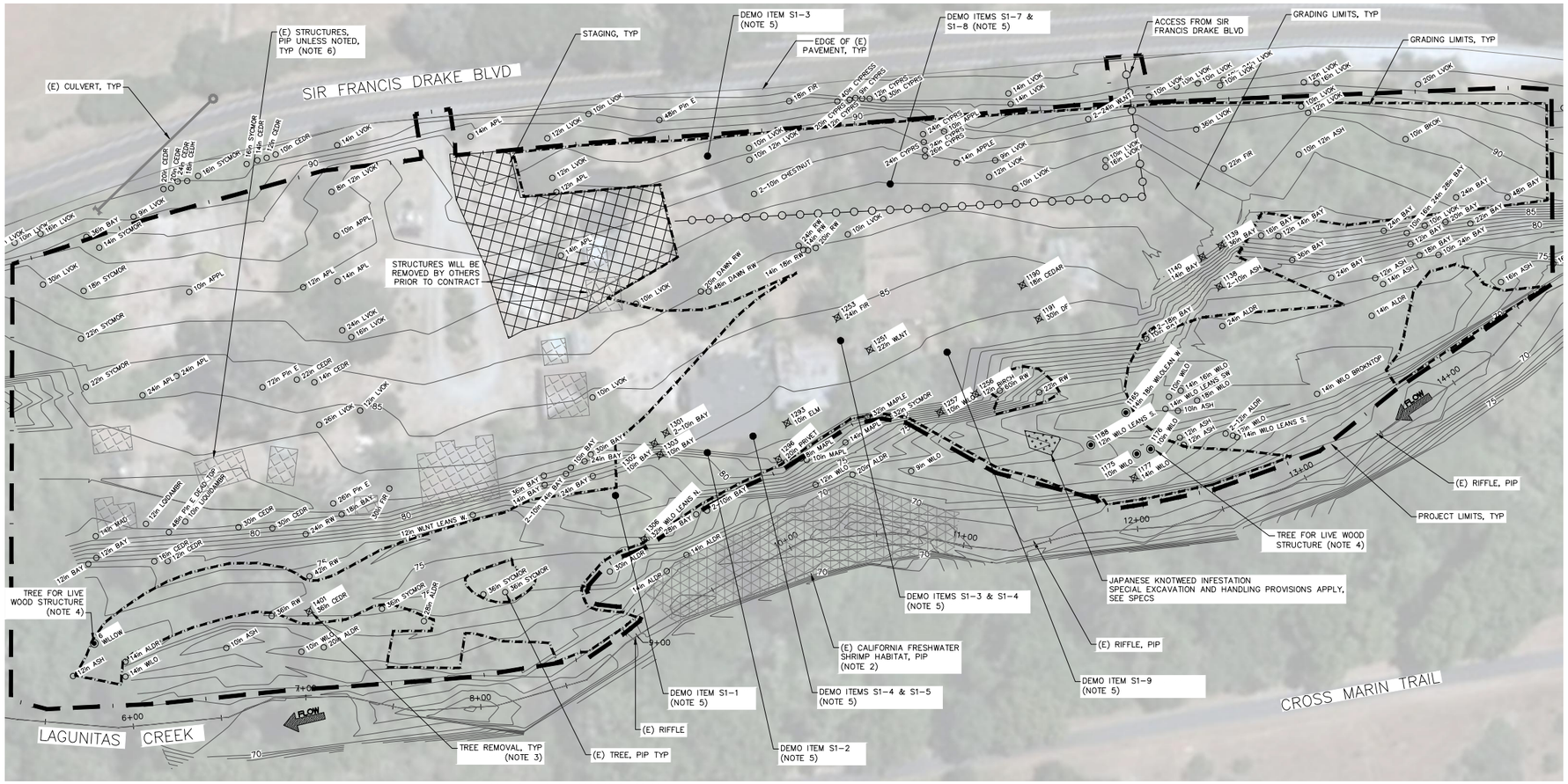
2.2.2 Alternatives

The following alternatives for the Lagunitas Creek Floodplain and Riparian Enhancement Project are evaluated in this EA:

- Alternative A: Action Alternative
- Alternative B: No Action Alternative

Alternative A: Action Alternative

Alternative A entails actions to expand and restore the channel and floodplain geomorphic, hydrologic, and ecological function at two sites (Sites 1 and 2) and to enhance native vegetation and remove non-native vegetation at all three sites along Lagunitas Creek. At Sites 1 and 2, the fill and remnants of structures built in the riparian corridor would be removed, creating floodplain and riparian habitat, while protecting stream banks below Sir Francis Drake (**Figures 2-4** and **2-5**). The proposed Alternative A actions would first remove residential structure remnants within the project boundary. Following removal of these hardscape features, the area in Sites 1 and 2 would be regraded to remove fill and create transitional slope, floodplain, backwater alcove, and high-flow channel and perennial channel features. In-channel habitat structures would be installed to improve and enhance existing and proposed channel features in the project reach. The project site would also be enhanced by removal of invasive and non-native plant species at all three sites. Once non-native vegetation is removed, the area would be revegetated using appropriate native plant species. Banks below Sir Francis Drake Blvd that may be susceptible to erosion would be protected with brush mattress, vegetated rock, and buried rock structures. Proposed habitat enhancements at Site 3 would include invasive and non-native plant species removal and native plant species revegetation only. The specific details regarding Alternative A actions for each site are summarized in **Table 2-1** and described further below. The construction work area for Alternative A would encompass approximately 6.03 acres in total. Alternative A includes approximately 2.71 acres of grading that would impact approximately 1.51 acres of existing riparian and upland habitat. The Project includes removal of approximately 1.20 acres (Site 1 = 1.04 acres, Site 2 = 0.16 acres) of former developed area, and restoration of 2.71 acres of transitional riparian and channel habitat.



SITE 1 - EXISTING CONDITIONS
PLAN VIEW
SCALE: 1" = 30'

SHEET NOTES

1. TOPOGRAPHY FROM GROUND SURVEY BY DOBLE THOMAS AND ASSOCIATES (JANUARY 2017).
2. CALIFORNIA FRESH WATER SHRIMP HABITAT MAPPED IN 2013 BY LARRY SERPA AS PART OF A SURVEY ON BEHALF OF THE MARIN MUNICIPAL WATER DISTRICT.
3. SALVAGE TREES DESIGNATED FOR REMOVAL, INCLUDING ROOTBALLS, THAT MEET SPECIFICATIONS FOR THE LARGE WOOD STRUCTURE. SEE SPECS.
4. TREES DESIGNATED FOR LIVE WOOD STRUCTURES SHALL BE FLAGGED AND PROTECTED DURING GRADING OPERATIONS. SEE TABLE, THIS SHEET.
5. CONTRACTOR SHALL ANTICIPATE DEMOLITION AND OFFHAUL OF APPROXIMATELY 60 TONS OF MISCELLANEOUS RUBBLE. SEE TABLE THIS SHEET.
6. PROTECT EXISTING STRUCTURES OUTSIDE OF GRADING LIMIT UNLESS NOTED. THESE STRUCTURES WILL BE REMOVED IN CONJUNCTION WITH SITE 3 ACTIVITIES.

SITE 1 - TREE REMOVAL

POINT	DESCRIPTION
1138	2-10" ASH
1139	36" BAY
1140	14" BAY
1177	14" WILLOW
1190	18" CEDAR
1191	30" DOUGLAS FIR
1251	22" WALNUT
1253	24" FIR
1256	12" BIRCH
1257	10" WILLOW
1293	10" ELM
1296	20" PRIVET
1301	2-10" BAY
1302	10" BAY
1303	10" BAY
1306	32" WILLOW LEANS N.
1401	36" CEDAR

SITE 1 - DEMOLITION AND OFFHAUL

DEMO ITEM	MATERIAL
S1-1	CONCRETE RETAINING WALL: APPROX 40 FT LONG, 4 FT HIGH, 1FT THICK
S1-2	ASPHALT RAMP/ WALKWAY: APPROX 75 SQ FT BY 3 INCH THICK
S1-3	ASPHALT DRIVEWAY: APPROX 200 SQ FT BY 3 INCH THICK
S1-4	BASEMENT WALLS: APPROX 6 FT TALL WALL OF CINDERBLOCKS (8 INCH THICK) ON THREE SIDES BY APPROX 45 FT IN LENGTH
S1-5	CONCRETE BASEMENT FLOOR: APPROX 350 SQ FEET BY 4-6 INCH THICK
S1-6	CONCRETE BOAT RAMP: APPROX 30 FT LONG, 2 FT WIDE, 1 FT HIGH SIDE WALLS; ALL APPROX 4 INCH THICK
S1-7	ASPHALT DRIVEWAY: APPROX 250 SQ FT BY 4 INCH THICK.
S1-8	DRIVEWAY CONCRETE SIDEWALL: APPROX 25 FEET LONG BY 1 FT HIGH BY 3 INCH THICK
S1-9	RETAINING WALL: APPROX 25 FT LONG , 4.5 FT TALL, AND 6 INCH THICK

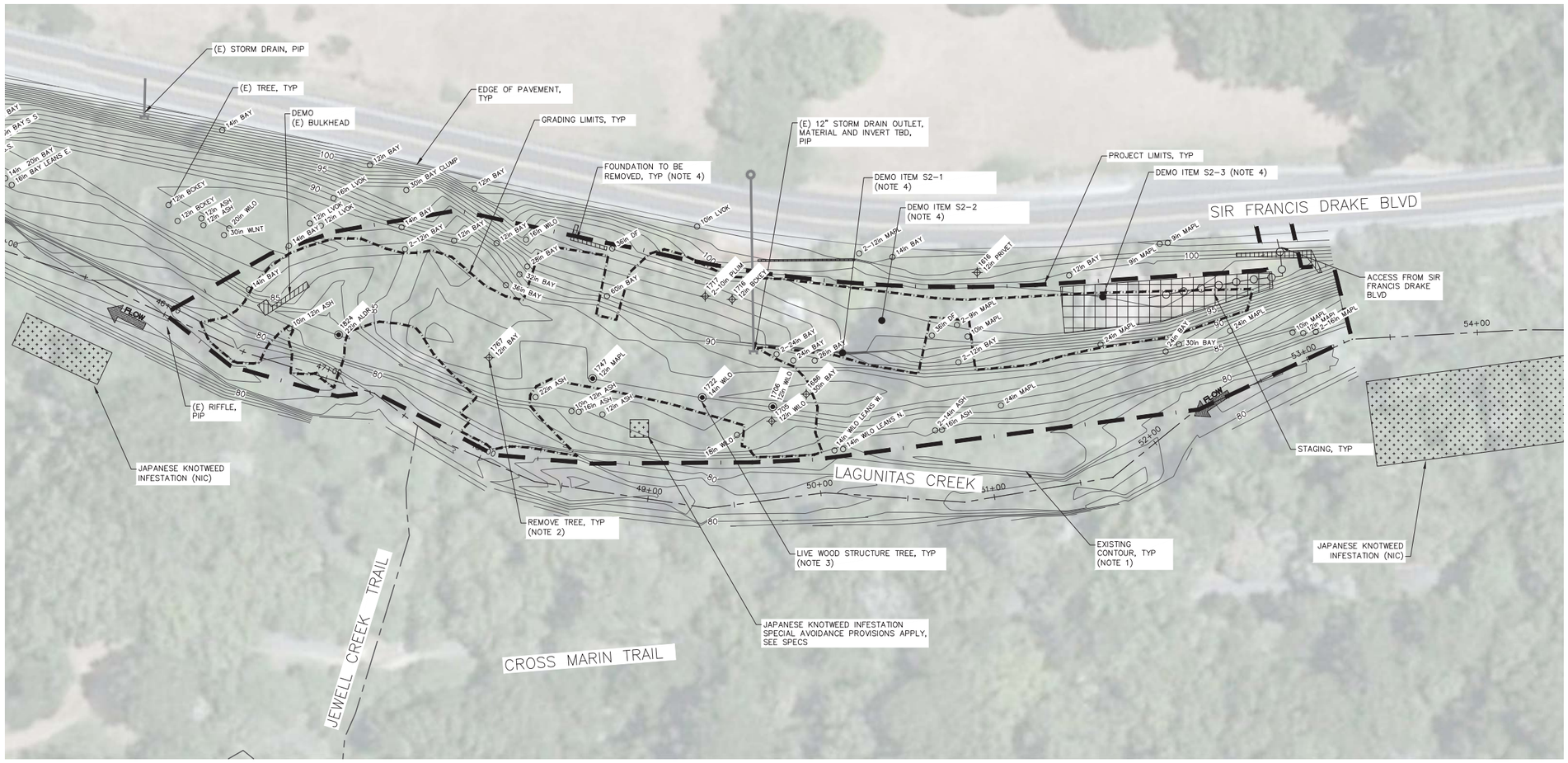
0 15 30 60
SCALE (FEET)

SITE 1 - LIVE WOOD STRUCTURES

POINT	DESCRIPTION
6	WILLOW
1165	14"- 18" WILLOW
1175	10" WILLOW
1176	10" WILLOW
1188	12" WILLOW

SOURCE: ESA, 2017

Figure 2-1
Site 1 Existing Conditions



SITE 2 - EXISTING CONDITIONS
PLAN VIEW
SCALE: 1" = 30'

0 15 30 60
SCALE (FEET)

SHEET NOTES

1. TOPOGRAPHY FROM GROUND SURVEY BY DOBLE THOMAS AND ASSOCIATES (JANUARY 2017).
2. SALVAGE TREES DESIGNATED FOR REMOVAL, INCLUDING ROOTBALLS, THAT MEET SPECIFICATIONS FOR THE LARGE WOOD STRUCTURE. SEE SPECS.
3. TREES DESIGNATED FOR LIVE WOOD STRUCTURES SHALL BE FLAGGED AND PROTECTED DURING GRADING OPERATIONS. SEE TABLE, THIS SHEET.
4. CONTRACTOR SHALL ANTICIPATE DEMOLITION AND OFFHAUL OF APPROXIMATELY 25 TONS OF MISCELLANEOUS RUBBLE. SEE TABLE THIS SHEET.

TREE REMOVAL TABLE

POINT	DESCRIPTION
1616	12" PRIVET
1686	30" BAY
1705	12" WILLOW
1706	12" WILLOW
1716	12" BUCKEYE
1717	2-10" PLUM
1722	14" WILLOW
1747	12" MAPLE
1767	12" BAY
1824	22" ALDER

SITE 2 - DEMOLITION AND OFFHAUL

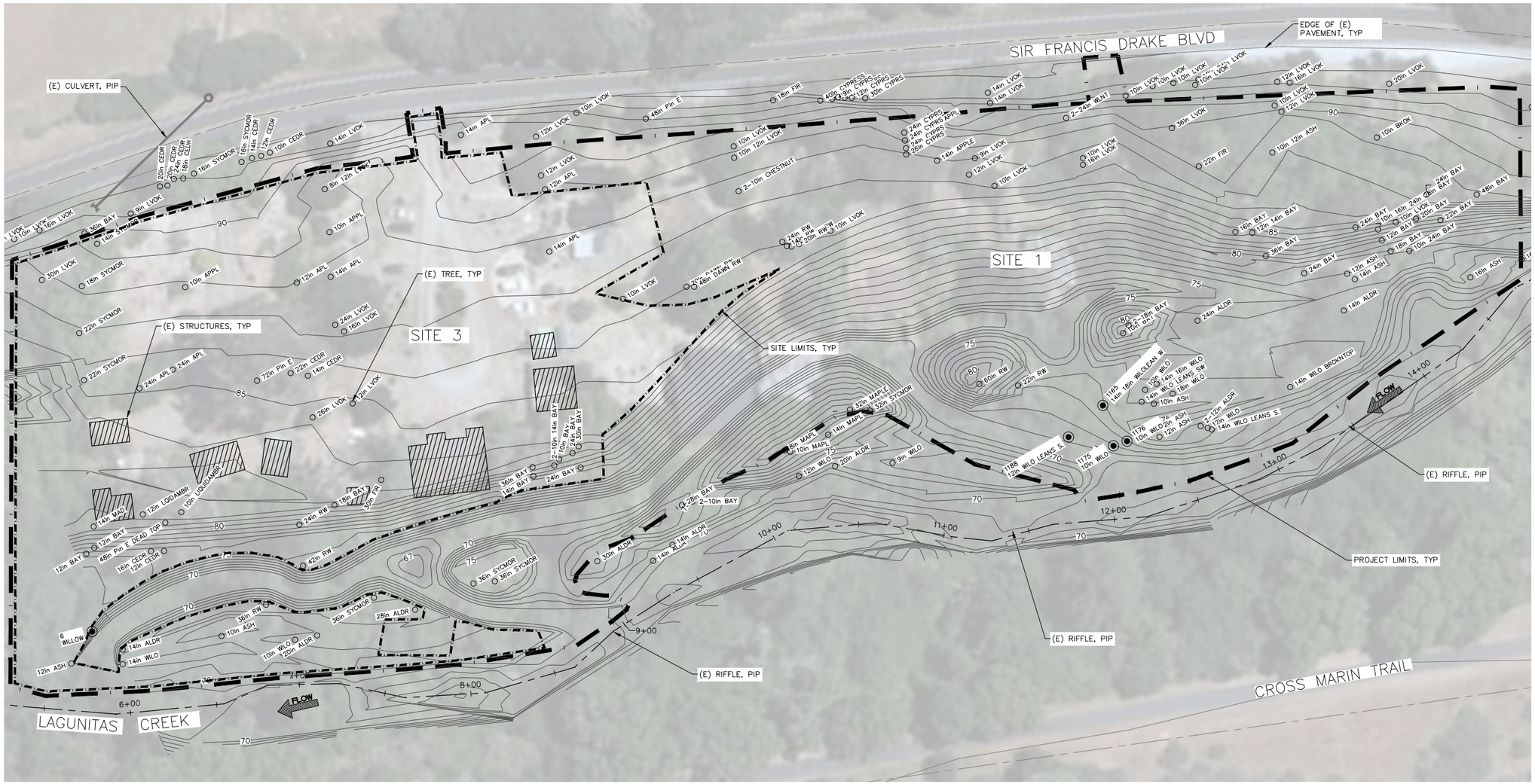
DEMO ITEM	MATERIAL
S2-1	CONCRETE RETAINING WALL: APPROX 25 FT LONG, 6.5 FEET TALL, AND 6 INCHES THICK
S2-2	CONCRETE PAD: APPROX 450 SQ.FT BY 4 INCH THICK
S2-3	GROUTED STONE RETAINING WALL: APPROX 45 FT LONG, 1.5 FT TALL, AND 1 FT THICK

LIVE WOOD STRUCTURES

POINT	DESCRIPTION
1706	12" WILLOW
1722	14" WILLOW
1747	12" MAPLE
1824	22" ALDER

SOURCE: ESA, 2017

Figure 2-2
Site 2 Existing Conditions



SITE 3 - EXISTING CONDITIONS
PLAN VIEW
SCALE: 1" = 30'

0 15 30 60
SCALE (FEET)

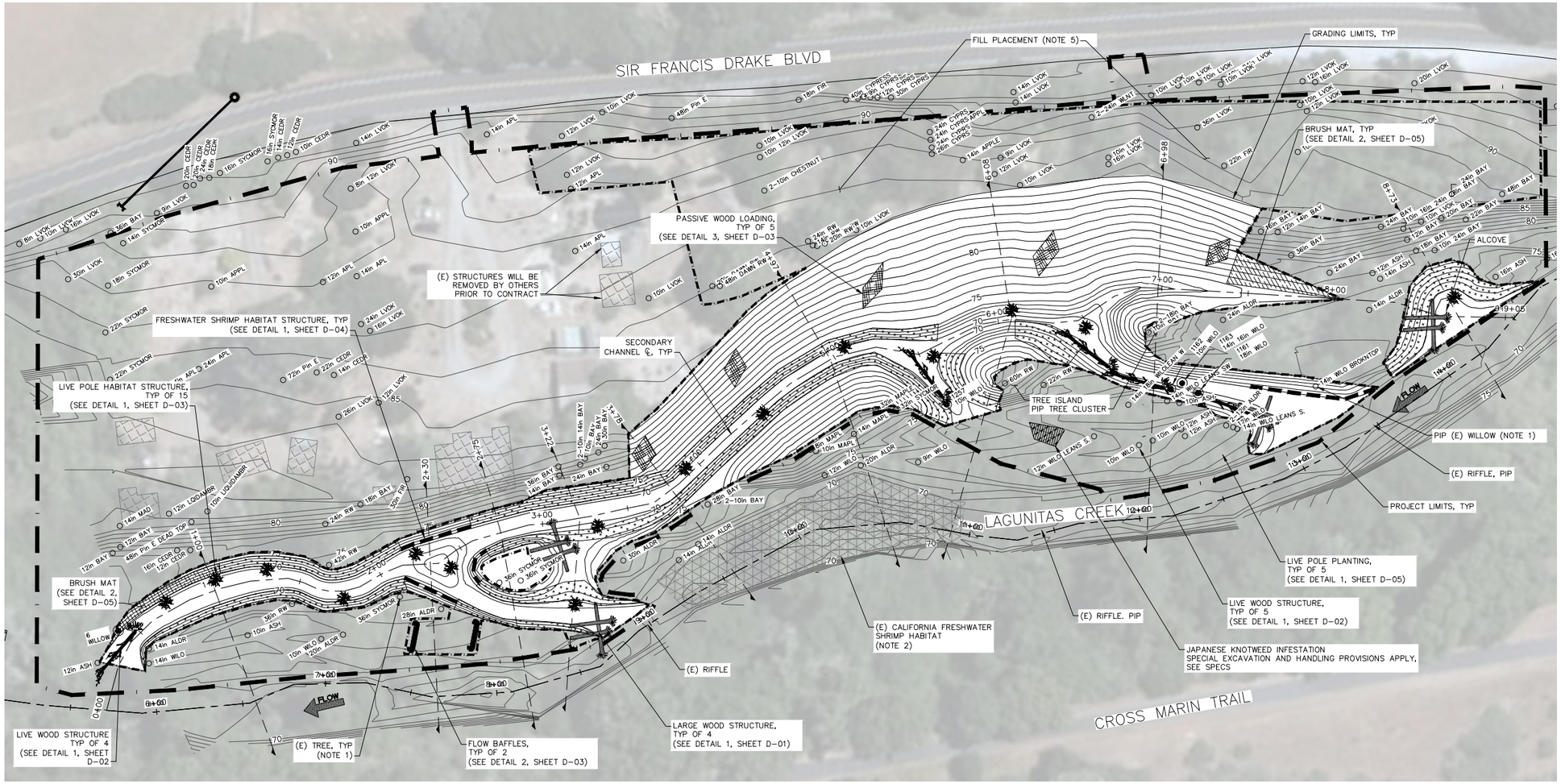
SHEET NOTES

1. TOPOGRAPHY FROM GROUND SURVEY BY DOBLE THOMAS AND ASSOCIATES (JANUARY 2017).

SOURCE: ESA, 2017

Lagunitas Creek Floodplain and Riparian Restoration Project . 150145

Figure 2-3
Site 3 Existing Conditions



SITE 1 - GRADING PLAN
PLAN VIEW

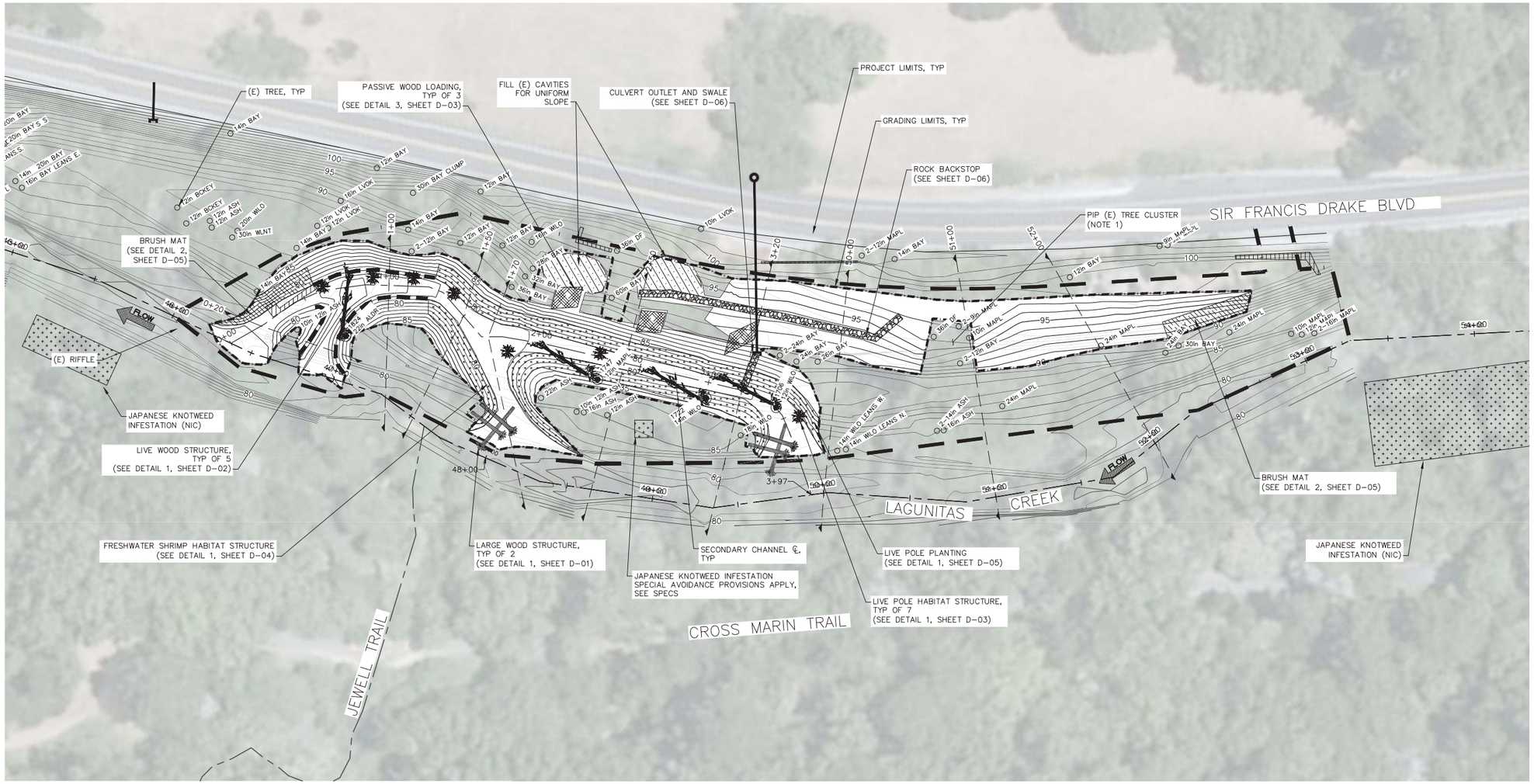
0 15 30 60
SCALE (FEET)

SHEET NOTES

1. PROTECT TREES TO REMAIN. GRADING OPERATIONS TO MAINTAIN 8 FEET OFFSET FROM TRUNK. STAKE GRADING LIMITS AND GRADING OFFSET FROM TREES FOR REVIEW, ADJUSTMENT, AND APPROVAL BY RESTORATION ENGINEER.
2. PROTECT FRESH WATER SHRIMP HABITAT, NO GRADING IN WETTED CHANNEL. CALIFORNIA FRESHWATER SHRIMP HABITAT IS APPROXIMATE BASED ON SURVEYS CONDUCTED BY LARRY SERPA (2013).
3. FOR PROFILES SEE SHEET SHEET C-03.
4. FOR GRADING SECTIONS SEE SHEETS C-04 AND C-05.
5. EVENLY PLACE 1000 CY ± OF EXCAVATED MATERIAL.

SOURCE: ESA, 2017

Figure 2-4
Site 1 Grading Plan



SITE 2 - GRADING PLAN
PLAN VIEW
SCALE: 1" = 30'

0 15 30 60
SCALE (FEET)

SHEET NOTES

1. PROTECT TREES TO REMAIN. GRADING OPERATIONS TO MAINTAIN 8 FEET OFFSET FROM TRUNK. STAKE GRADING LIMITS AND GRADING OFFSET FROM TREES FOR REVIEW, ADJUSTMENT, AND APPROVAL BY RESTORATION ENGINEER.
2. FOR PROFILES SEE SHEET SHEET C-08.
3. FOR GRADING SECTIONS SEE SHEETS C-09 AND C-10.

SOURCE: ESA, 2017

Figure 2-5
Site 2 Grading Plan

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Table 2-1 lists the proposed actions for Alternative A. **Table 2-2** presents a summary of the area affected by proposed actions on each site.

TABLE 2-1
SUMMARY OF ALTERNATIVE A ENHANCEMENT ACTIONS

Restoration Action	Site 1	Site 2	Site 3
Demolition	X	X	
Biotechnical Bank Enhancements	X	X	
Floodplain Enhancement	X	X	
New Secondary Channel	X		
New Alcove	X	X	
In-channel Enhancement	X	X	
Vegetation Removal and Management	X	X	X

TABLE 2-2
SUMMARY OF ALTERNATIVE A ENHANCEMENT AREAS BY SITE

Project Site	Project Footprint		Restored Area (acres)
	(acres)	(Linear Feet)	
Sites 1	4.60	910	1.98
Site 2	1.43	670	0.73
Project Total	**6.03**	**1580**	**2.71**

Site 1

Site 1 is located near the downstream project limit, immediately upstream from and adjacent to Site 3. Proposed site restoration actions include removing remnants of former residential structures that were removed by NPS in 2016; floodplain enhancements; biotechnical bank protection; creation of a secondary channel to provide salmonid rearing habitat; enhanced habitat complexity with large wood structures; and enhanced native vegetation throughout the project site. These actions are described further below.

Removal of Residential Structure Remnants and Former Fill. Features associated with former residential structures to be removed at Site 1 include concrete paths, retaining walls and bulkheads, drainage features, fencing and steps, some of which are immediately adjacent to the creek bank. These features would be removed using heavy equipment, such as a long-arm excavator and front-end loader. Concrete and other debris would be removed from the site and disposed at a nearby landfill or alternative site. Following removal, the site would be regraded according to the restoration design plans. Site grading would include removal and disposal or reuse of approximately 10,227 cubic yards of soil, former fill material that was deposited at the project site in the 1930s. Spoils to be reused and placed on site would support creation of more naturalized diverse upland topographic features as well as to establish swales for stormwater runoff and treatment along Sir Francis Drake Boulevard. The remaining spoils would be hauled offsite for various uses including general fill for nearby construction projects agricultural

rangelands and local quarries, and landfill cover material at the Redwood Landfill in Novato as described later in this chapter under Construction Methods, Spoils Reuse and Disposal. Removal of the remnant residential structures and former fill material would restore the creek channel and floodplain to a more functional configuration in terms of geomorphic and hydrologic processes, and enhance riparian and salmonid habitat.

Floodplain Enhancement. Once the former fill material is removed from the site, a secondary channel and integral alcove would be created behind the new 'mid-channel bar' within a new floodplain terrace. The enhanced floodplain area would restore channel/floodplain hydrologic connectivity and provide seasonal salmonid rearing and California freshwater shrimp (CFS) winter refugia habitat.

Biotechnical Bank Stabilization Measures. Biotechnical bank stabilization measures, including brush mats, would be installed at cut banks along the back of the newly graded floodplain and to preserve and protect the slope below Sir Francis Drake Boulevard. The brush mats are robust biotechnical measures that utilize live cuttings from native trees, such as willow and alder, to stabilize and protect graded banks. The cuttings are anchored onto the graded bank using a system of soil embedment, biodegradable fabrics, rope and stakes. The live cuttings root and sprout to establish as trees which provide both stabilization and habitat functions on the restored bank.

Secondary Channel Creation. An ephemeral secondary channel would be created within the new floodplain area. This channel would activate during winter base flows. During summer base flows, the downstream end of the secondary channel would function as an alcove that provides salmonid rearing habitat.

Large wood structures would be installed at the upstream, downstream, and lateral connections of the secondary channel to the main creek channel. Live wood structures and habitat structures utilizing live cuttings would be installed along the edges of the new secondary channel to enhance habitat complexity and cover.

In-channel Enhancements. Woody debris would be placed at select and appropriate locations on the channel edge of Lagunitas Creek to support passive wood loading and woody debris recruitment in the creek channel. Large key logs would be installed along the banks or in the channel (depending on location and access) so that high flows could ultimately move and deposit the wood material throughout the stream corridor and, in turn, create more complex habitat types similar to several natural analogs that have been observed in other areas of Lagunitas Creek and in San Geronimo Creek.

Vegetation Removal and Management. Most mature native trees would be preserved and incorporated into the secondary channel and alcove grading plan. An existing patch of the invasive non-native plant Japanese knotweed (*Fallopia japonica*) is within the proposed grading footprint of Site 1 as shown on Figure 2-1. Select patches of the following invasive species would be removed by SPAWN within the areas of Project Sites 1, 2, and 3: crocosmia, Himalayan blackberry, and English ivy. The following species would be removed by contractor(s) by scraping topsoil from the fill pads during grubbing: bull thistle, vinca, poison hemlock. Ongoing maintenance and removal of select invasive plants at Project Sites 1, 2, and 3 by SPAWN will

occur for 5 years following construction. This maintenance would occur no less than quarterly and would include the efforts for removal of the following species from the project sites: Himalayan blackberry, crocosmia, and English ivy. Invasive plant monitoring and mitigation is discussed in Chapter 3.3, Vegetation. A monitoring and mitigation plan will be developed by SPAWN prior to the start of construction and approved by NPS. All disturbed areas would be revegetated with appropriate native riparian plant species.

Site 2

Site 2 is located approximately 500 feet downstream of the Samuel P. Taylor Park boundary. Proposed restoration actions include similar features as proposed for Site 1 including removing remnants of former residential structures that were removed by NPS in 2016; floodplain enhancements; off-channel habitats; biotechnical bank protection; enhanced habitat complexity with large wood structures; and enhanced native vegetation throughout the project site. In addition, site grading would enhance the drainage pathway from existing culvert outfalls that discharge storm runoff from Sir Frances Drake Boulevard. These actions are described further below.

Removal of Residential Structure Remnants and Former Fill. Features associated with former residential structures to be removed at Site 2 include foundations, retaining walls, and bulkheads. These features would be removed using heavy equipment, such as a long-arm excavator and front-end loader. Concrete and other debris would be removed from the site and disposed at a nearby landfill. Following removal, the site would be regraded according to the restoration design plans. Site grading would include removal and disposal or reuse of approximately 3,238 cubic yards of soil, former fill material in the building footprints Spoils to be reused and placed onsite would support creation of more naturalized diverse upland topographic features as well as to establish swales for stormwater runoff and treatment along Sir Francis Drake Boulevard. The remaining spoils would be hauled offsite for various uses including general fill for nearby construction projects, agricultural rangelands, and local quarries, and landfill cover material at the Redwood Landfill in Novato as described later in this chapter under Construction Methods, Spoils Reuse and Disposal.

Floodplain Enhancement. Once the former fill material is removed from the site, the floodplain footprint would be expanded to create transitional (riparian to upland) habitat while maintaining ‘high ground’ at the upstream end of site along Sir Francis Drake Boulevard.

A backwater alcove would be created within the existing floodplain that connects to the downstream end of site and extends up through established mature trees to create perennial CFS and salmonid rearing habitat.

Grading at the upstream of the backwater alcove would enhance the drainage pathway from an existing culvert outfall that discharges storm runoff from Sir Frances Drake Boulevard. The existing culvert outfall would be maintained and integrated into the backwater alcove grading.

Biotechnical Bank Stabilization Measures. Targeted bank protection measures, such as vegetated rock, would be installed to stabilize the potentially threatened banks below Sir Francis

Drake Boulevard. Brush mats and areas of live pole planting[1] would be installed at cut banks along the edges of the newly graded alcove and transitional slopes. The brush mats are robust biotechnical measures that utilize live cuttings from native trees, such as willow and alder, to stabilize and protect graded banks. The cuttings are anchored onto the graded bank using a system of soil embedment, biodegradable fabrics, rope and stakes. The live cuttings root and sprout to establish as trees which provide both stabilization and habitat functions on the restored bank.

In-channel Enhancements. To support passive wood loading and woody debris recruitment in the creek channel, large wood structures would be placed at the connections to the Lagunitas Creek channel and live pole habitat structures would be installed along the edge of the new alcove to provide habitat complexity and cover. The large wood logs would be installed along the banks or in the creek channel (depending on location and access) so high flows can ultimately move and deposit more wood material throughout the stream corridor and create more complex habitat.

Vegetation Removal and Management. Most mature native trees would be preserved and incorporated into the alcove grading plan. An existing patch of the invasive non-native plant Japanese knotweed is within the project boundary but outside of the proposed grading footprint of Site 2. There are also two patches of Japanese knotweed that are outside of the boundary of Site 2, as shown on Figure 2-2. During project construction, the patch of Japanese knotweed that lies outside of the grading footprint but within the project boundary would be fenced and avoided by machinery and equipment. Select patches of the following invasive species would be removed by SPAWN within the areas of Project Sites 1, 2, and 3: crocosmia, Himalayan blackberry, and English ivy. The following species would be removed by contractor(s) by scraping topsoil from the fill pads during grubbing: bull thistle, vinca, poison hemlock. Ongoing maintenance and removal of select invasive plants at sites 1, 2, and 3 by SPAWN will occur for 5 years following construction. This maintenance would occur no less than quarterly and would include the efforts for removal of the following species from the project sites: Himalayan blackberry, crocosmia, English ivy. Invasive plant monitoring and mitigation is discussed in Chapter 3.3, Vegetation. A monitoring and mitigation plan will be developed by SPAWN prior to the start of construction and approved by NPS. Invasive plant monitoring and mitigation is discussed in Chapter 3.3, Vegetation. All disturbed areas would be revegetated with appropriate native riparian plant species.

Site 3

Site 3 is located at the downstream limit of the project area and is bounded on the downstream end by an unnamed tributary. The eight existing structures and native plant nursery on the site would remain in place. Proposed restoration actions include enhanced native vegetation throughout the project site. These actions are described further below.

Vegetation Removal and Management. Invasive and non-native plant species in the project site would be removed. There are no existing patches of Japanese knotweed within the project boundary of Site 3. All disturbed areas would be revegetated with appropriate native riparian plant species.

[1] Live pole planting is a radial placement of willow poles that are vertically angled to create cover.

Risk of Flooding

The eight remaining structures and native plant nursery at Site 3 are within the active floodplain of Lagunitas Creek and could be susceptible to flooding. Any authorization for SPAWN to occupy structures and operate at this location are conditional. Should flooding occur at this, NPS will reevaluate occupancy of the site. It remains the sole determination of the NPS to identify future uses of the area identified as Site 3 in the case of flooding or other impacts to existing infrastructure. As part of the planning process, modeling and design of a fully restored floodplain and backwater habitat have been developed and may become the basis for additional restoration actions at a later time. However, these designs are not being evaluated as part of the proposed action under this project.

Timing of Work

Construction of the proposed actions would occur in one phase (construction season) with actions at Sites 1, 2, and 3 occurring in the first year with additional construction done in a second year if necessary.

Ground-disturbing work would occur during the summer dry season, generally between June 15 and October 15. Work hours would be 7:00 a.m. to 5:00 p.m., Monday-Friday.

Site revegetation would occur in the fall.

Construction Methods

The preferred approach for implementation of restoration activities is to use the least environmentally impacting approaches, favoring use of hand-held equipment over mechanized equipment wherever possible.

Staging. Equipment and materials, would be staged in areas that have been previously disturbed (i.e., existing site access paths, turn-outs, etc.).

Grading. Equipment used for floodplain restoration, and biotechnical stabilization would range from hand tools for small areas or in sensitive locations to mechanized equipment for larger grading needs. When using mechanized equipment, excavators would be located outside the channel on access roads, benches, or adjacent property to minimize disturbance to the existing channel.

Biotechnical Bank Stabilization. Where biotechnical stabilization is implemented, care would be taken to disturb the least amount of existing native vegetation possible, including mature trees. Biotechnical stabilization activities may include extending arm excavators, small bulldozers (Bobcat style), front-end loaders, and 10 cubic-yard dump trucks. Based on project scale and features, bank stabilization typically requires five to ten days to complete.

Flow Exclusion Areas. Channel flow exclusion areas would be required where in-channel structures (large wood structures) are proposed. A temporary flow exclusion system would be used to isolate discrete areas of work to create dry, workable conditions and prevent sediment transport and turbidity in adjacent areas of the creek. Flow of the entire Lagunitas Creek channel would not be diverted, only discrete areas along the creek banks would be affected. The

temporary exclusion system would use super sacks filled with gravel or similar material to exclude and redirect flows around the areas of work. Once the super sacks are in place, fish and other aquatic species would be relocated from the construction work area. Pump systems may be used to support management of water in work areas during the grading of the secondary channels and associated log and habitat structures. The water that could be encountered during these activities would be ground water that enters the excavated features and would not be surface water from the channel. The water control and diversion plan including proposed equipment would be submitted for approval by NPS and appropriate regulatory agencies prior to installation. The plan would describe the location and size of pumps, the alignment of diversion lines (e.g., pipes, hoses, etc.) and the location of the diversion outlet. The outlet for the diverted water would be a temporary percolation basin located in an upland area outside of the project grading limits. Diverted water would infiltrate into the ground and would not be directed into the channel. Specific equipment for the diversion system would include but not be limited to generator, pump countersunk into a sump pipe, hoses, pipes, screens (per NMFS requirements for salmonids) and energy dissipation materials such as gravel bags and cobble.

Tree Removal. Large, mature and healthy native trees greater than 12-inch diameter at breast height (DBH) would be preserved to the extent feasible. Preserved trees would be integrated with landscape design as tree-island features to provide added topographic complexity in the floodplain and to preserve the existing riparian canopy cover over the creek channel and wildlife habitat. However, as shown on Figures 2-1 and 2-2, approximately 29 trees ranging from 10 to 36 inches DBH would be removed and repurposed to construct large wood structures installed to enhance in-channel habitat. SPAWN will consult with NPS and other appropriate agencies if any additional trees that are not identified in the plans need to be removed. **Table 2-3** lists the number of trees that may be removed at each site.

TABLE 2-3
SUMMARY OF TREE IMPACTS FOR ALTERNATIVE A

Restoration Site	Number of Trees to be Removed (>10”DBH)
Site 1	18 (10-36” DBH)
Site 2	11 (10-30” DBH)
Total	**29**

Utility Relocation. Given the past land uses at the site, encountering private and public utilities (wells, pumps, communication lines) is possible. Underground utilities at Sites 1 and 2 have been removed. At Site 3 there is a possibility of existing utilities (e.g., septic system, water lines, communications lines and electricity), however the revegetation in Site 3 would not disturb these lines. Therefore, no sewer lines, groundwater wells, phone, cable, or water supply lines would be impacted by the project.

Spoils Reuse and Disposal. The project activities (demolition, floodplain restoration instream features, etc.) will generate approximately 13,505 cubic yards of material (including 40 cubic yards of concrete) (Site 1: 10,227 cy; Site 2: 3,238 cy). Approximately 1,000 cubic yards would be reused or redistributed onsite. The remaining 12,505 cubic yards would be hauled offsite for various uses

including general fill for nearby construction projects, deposits on agricultural rangelands, local quarries, and landfill cover material at the Redwood Landfill in Novato. The legal disposal sites, identified annually by the contractor, would be required to be permitted to receive soil materials and may vary for each construction phase. Off-haul locations would be within 30 miles from the project site.

Revegetation and Maintenance. Revegetation and vegetation maintenance activities would occur throughout the project site to further promote and establish a healthy native riparian corridor. Vegetation maintenance activities include monitoring of and as-needed repairs to irrigation systems, replacement of dead plants and removal of non-native invasive plant species. Revegetation and maintenance activities would be performed with limited requirements for construction equipment.

Alternative B: No Action Alternative

NEPA requires evaluation of the environmental consequences of a No Action Alternative. Under the no action scenario, the existing footings and foundations from former structures on Sites 1 and 2 would not be removed. No floodplain or riparian enhancement actions including grading, structures, bank stabilization, invasive removal, or revegetation would be implemented and the three sites would be left to naturally evolve over time. Without floodplain or riparian enhancement actions, current failing banks will continue to erode causing a loss of mature native trees, input of fine sediment, and remaining footings and foundations to fall into the channel. Loss of shade from mature trees, fine sediment, and concrete rubble in the channel are all detrimental to spawning and rearing habitat for Coho.

2.3 Cumulative Impacts

The Council on Environmental Quality's regulations to implement NEPA require the assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered in each of the resource sections of Chapter 3.

Cumulative impacts were determined by combining the impacts of the alternative being considered with other past, present, and reasonably foreseeable future actions. Ongoing or reasonably foreseeable future projects in the surrounding region of the project are presented in **Table 2-4**.

TABLE 2-4
CUMULATIVE IMPACTS PROJECT LIST

Title	Location	Project Description
1) Lagunitas Creek Winter Habitat and Floodplain Enhancement Project (sponsored by Marin Municipal Water District)	Numerous sites along Lagunitas Creek, approximately 0.25 miles downstream from the project.	This project would stabilize and improve Lagunitas Creek salmonid populations by increasing the winter habitat carrying capacity for Coho salmon and steelhead trout in Lagunitas Creek. The projects would modify hydrology and enhance and restore existing floodplain and instream habitat at a number of locations in Lagunitas Creek.
2) Marin Municipal Water District (MMWD) Enhancement Sites 1 through 12 on Lagunitas Creek	MMWD Sites 1 and 2 are located approximately two miles upstream from the community of Jewell and Samuel P. Taylor State Park. MMWD Sites 3 through 6 are located 0.25 to 1 mile downstream of project site 1. MMWD sites 7 through 12 are located 3 to 4 miles downstream of project site 1.	MMWD sites 1 and 2 are in California State Park lands, within Samuel P. Taylor State Park. MMWD sites 3 through 6 are on National Park Service lands and are in phase 1 in 2017. MMWD sites 7 through 12 are on National Park Service lands and are phase 2 in 2018. The purpose of the project is to stabilize and improve the Lagunitas Creek salmonid populations by increasing the winter habitat carrying capacity for Coho salmon and steelhead trout in Lagunitas Creek.
3) Jewell Creek Culvert Replacement Project	The project site is located approximately three miles east of the town of Olema and approximately four miles north of Kent Lake in unincorporated Marin County. This site is north of Samuel P. Taylor State Park within Golden Gate National Recreation Area and is owned and operated by the NPS. The culvert was installed and is operated by MMWD.	This project was recently completed. The objective was to reduce potential erosion and annual persistent sediment loading into Lagunitas Creek, improve fish passage, and provide winter refuge habitat for salmonids at the confluence of Jewell and Lagunitas Creek. The project involved replacement of an existing round culvert with a bottomless arch culvert and replace a secondary drainage culvert at the confluence of Jewell and Lagunitas Creeks.
4) Caltrans Culvert Replacement Project	Located at Post Mile 24.7, which is approximately 1.8 miles south of the town of Olema, on State Route 1.	The project involves the removal of the two undersized and damaged 24-inch-diameter culverts beneath State Route 1 that currently convey intermittent flows and also the construction of a cast-in-place or precast, reinforced concrete, bottomless culvert.
5) Point Reyes Station Bridge Replacement	The bridge serves as a connection between Point Reyes Station and the unincorporated town of Olema to the south of State Route 1 (Highway 1) in Marin County, California.	A bridge that has been in place for more than 80 years and leads to Point Reyes Station will be demolished and replaced with a new bridge across Lagunitas Creek. Caltrans has determined that the steel bridge is deteriorating and needs to be updated to meet current seismic and safety standards for all users of the bridge.
6) Sir Francis Drake Boulevard Bridge Replacement	Sir Francis Drake Boulevard Bridge is located just west of Highway 1 and is a narrow two-lane roadway that provides access between the community of Inverness as well as Point Reyes Station and the Point Reyes National Seashore.	The County of Marin is replacing bridges that are no longer functional and/or are structurally inadequate. Sir Francis Drake Boulevard Bridge (over Olema Creek) requires replacement while at the same time protecting riparian habitat and not impacting adjacent Point Reyes National Seashore. This bridge is the access point to the Cross Marin Trail and MMWD Enhancement Project Sites 1 and 2.
7) Japanese Knotweed Eradication	NPS lands within the Lagunitas Creek watershed.	NPS is conducting an effort to control and eradicate this species. The NPS has been engaging in managing this species through surveys and treatments. Japanese knotweed patches have been mapped and flagged through the project area by NPS staff. All knotweed patches in the project area would be avoided during construction. SPAWN will implement mitigation and monitoring measures during and after construction to achieve eradication of the patch and prevention of its spread.

2.4 Mitigation and Monitoring

The following mitigation measures (MMs) (which include monitoring requirements) are designed to reduce potential project impacts to less than significant levels.

TABLE 2-5
MITIGATION MEASURES

Mitigation	Description
MM HYD-1	**Clear-Water Creek Diversions and Construction Flow Diversion.** The flow diversion area will encompass the minimum area necessary to perform the restoration activity. The period of flow diversion shall extend for the minimum amount of time needed to perform that maintenance activity. Where feasible and appropriate, diversions shall occur via gravity driven systems. Pumped water shall be discharged in conformance with all applicable laws and permit requirements and the channel and banks shall be returned to pre-project condition in those areas affected by diversion structures/activities. A qualified biologist will be present to ensure that state or federally listed fish and other aquatic vertebrates are not stranded during construction and implementation of channel diversion. Prior to flow diversions, the affected area will be surveyed by a qualified biologist, and if necessary, relocation procedures will be implemented to ensure that state and federally listed fish and other aquatic invertebrates are not adversely affected (outlined in MM BIO-2 and MM BIO-5). SPAWN shall prepare a Flow Diversion Plan to be approved by the NPS, RWQCB, USFWS, NMFS, and CDFW prior to beginning work. The flow diversion plan shall review all clear-water creek diversions and construction diversion considerations and best management practices described in the Basis of Design Report completed by ESA (2016) and/or any more recent design report completed to date. Examples of required BMPs include the following: a. Sediment disturbance shall be minimized to the extent feasible during removal of in-water debris or excavation in conjunction with creek restoration. b. Silt curtains shall be deployed around work activities that may generated significant turbidity. c. Where flow diversion pumps are required (clear-water gravity diversion shall be the preferred method), intakes shall be screened with less than 5-millimeter mesh screen to prevent other aquatic organisms from entering the pump. In addition, a filtration/settling system shall be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system shall be based on the actual rate of discharge at time of construction. d. Super sacks (gravel-filled sacks) installed around the flow exclusion area (not to be installed across the entire creek channel) shall be constructed of sandbags or gravel bags secured with polyethylene plastic sheeting; water-filled bladders; interlocking sheet piling; and/or other material. Gravel bags shall be filled with clean river run gravels. Super sacks shall be covered with visqueen to minimize water infiltration. During construction, inspection shall occur daily during the work week. Any gaps, holes, or scour shall be immediately repaired. e. Water pumped from excavation areas shall not be discharged directly to surface waters without being treated to remove sediments generated during the flow diversion activities. f. Water outfalls shall be contained within folded and secured filter fabric sediment traps to minimize turbidity to outfall areas. g. When work is completed, the flow diversion structure shall be removed as soon as possible but no more than 48 hours after work is completed. Impounded water shall be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. Super sacks shall be removed such that surface elevations of water impounded by the super sacks are lowered at a rate greater than one inch per hour.
MM BIO-1	**Seasonal Avoidance of Sensitive Aquatic Species.** In-water construction work with the potential to result in short-term impacts to sensitive aquatic species, including project activities that are expected to create turbidity or disturb the streambed, shall be conducted only from June 15 through October 15.
MM BIO-2	**Relocation of Special Status Fish.** If necessary, fish shall be captured and relocated to avoid injury and mortality and minimize disturbance during construction. NPS would be the point of contact for any fish relocation activities and results. The following guidelines shall apply: a. The project sponsor shall consult with NPS, with NOAA Fisheries (under Section 7 of the federal Endangered Species Act) and with CDFW (under Section 1600 of the California Endangered Species Act) to provide preservation and avoidance measures commensurate with the CDFW standards for the affected species.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM BIO-2 (cont.)	b. The capture and relocation of Coho Salmon and coastal steelhead associated with work site clear-water creek diversions would require an Incidental Take Permit under Section 2081 of the California Fish and Game Code, or a Safe Harbor Agreement, to be issued by the CDFW. A Safe Harbor Agreement shall be obtained prior to implementing fish relocation actions. c. Prior to and during the initiation of construction activities, a qualified CDFW- and NMFS-approved biologist and other approved fisheries biologists shall be present during installation and removal of clear-water creek diversions. d. For sites that require flow diversion and exclusion, the work area will be blocked by placing fine-meshed nets or screens above and below the work area to prevent state or federally listed species from re-entering the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed to prevent fish from passing under the screen and avoid scour by flow. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked twice daily (at the beginning and end of each work day) and cleaned of debris to permit free flow of water. Block nets will remain in place in order to prevent fish from re-entering the project area following relocation. e. Before removal and relocation begins, a qualified fisheries biologist will identify the most appropriate release location(s). In general, release locations should have water temperatures similar to (<3.6°F difference) the capture location and offer ample habitat (e.g., depth, velocity, cover, connectivity) for released fish, and should be selected to minimize the likelihood of reentering the work area or becoming impinged on exclusion nets or screens. f. The means of capture will depend on the nature of the work site, and will be selected by a qualified fisheries biologist. Complex stream habitat may require the use of electrofishing equipment (e.g., Smith-root LR-24 backpack electrofisher), whereas in outlet pools, aquatic vertebrates and invertebrates may be captured by pumping down the pool and then seining or dipnetting. Electrofishing will be used only as a last resort; if electrofishing is necessary, it will be conducted only by properly trained personnel following the NMFS guidelines dated June 2000 (NMFS, 2000). g. When feasible, initial fish relocation efforts will be performed several days prior to the scheduled start of construction. To the extent feasible, flow diversions and species relocation will be performed during morning periods. The fisheries biologist will survey the flow exclosures throughout the diversion effort to verify that no state or federally listed fish or aquatic invertebrates are present. Afternoon pumping activities should generally not occur and pumping should be limited to days when ambient air temperatures are not expected to be high. Air and water temperatures will be measured periodically, and flow diversion and species relocation activities will be suspended if temperatures exceed the limits allowed by NMFS guidelines. h. Handling of fish and aquatic invertebrates will be minimized. When handling is necessary, personnel will wet hands or nets before touching them. i. Prior to translocation, any state or federally listed species that are collected during surveys will be temporarily held in cool, aerated, shaded water using a five-gallon container with a lid. Overcrowding in containers will be avoided; at least two containers will be used and no more than 25 fish will be kept in each bucket. Aeration will be provided with a battery-powered external bubbler. Fish will be protected from jostling and noise, and will not be removed from the container until the time of release. A thermometer will be placed in each holding container and partial water changes will be conducted as necessary to maintain a stable water temperature. Special-status fish will not be held more than 30 minutes. If water temperature reaches or exceeds NMFS limits, the fish and other aquatic species will be released and relocation operations will cease. j. If state or federally listed fish are abundant, capture will cease periodically to allow release and minimize the time fish spend in holding containers. k. Fish will not be anesthetized or measured. However, they will be visually identified to species level, and year classes will be estimated and recorded. l. Reports on fish relocation activities will be submitted to CDFW and NMFS in a timely fashion. m. If mortality during relocation exceeds three percent (or as determined by NMFS), relocation will cease and CDFW and NMFS will be contacted immediately or as soon as feasible.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM BIO-3	**Impacts to Rare Plants.** a. A qualified biologist shall conduct a pre-construction survey for special status plant species with the potential to occur within the area of disturbance. At least two surveys shall be completed, one in winter or early spring to capture the flowering period of Western leatherwood and one in summer to capture the flowering period of California bottle brush grass. The surveys shall be floristic in nature and shall follow the procedures outlined in the California Department of Fish and Wildlife Publication Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW, 2009). b. If special status plant species are found, SPAWN shall coordinate with NPS, USFWS, and CDFW to provide preservation and avoidance measures commensurate with the standards provided in applicable NPS, USFWS, and CDFW protocols for the affected species. The preservation and avoidance measures shall include, at a minimum, appropriate buffer areas clearly marked during project activities with orange fencing, monitoring by a qualified plant biologist, and the development and implementation of a replanting plan.
MM BIO-4	**Contractor Environmental Awareness Training and Site Protection**. All construction personnel that are working in areas of potential endangered species habitat shall attend an environmental education program delivered by a qualified biologist prior to working on the project site. The program shall include an explanation as how to best avoid the accidental take of California freshwater shrimp, California red-legged frog, listed birds and fish species. The program shall also include how to identify and avoid Japanese knotweed, and what to do if new plants are found. The training session shall be mandatory for contractors and all construction personnel. The field meeting shall include topics on species identification, life history, descriptions, and habitat requirements during various life stages. Emphasis shall be placed on the importance of the habitat and life stage requirements within the context of project maps showing areas where minimization and avoidance measures are being implemented. The program shall include an explanation of appropriate federal and state laws protecting endangered species. The contractor shall provide closed garbage containers for the disposal of all trash items (e.g., wrappers, cans, bottles, food scraps). The site shall be cleaned of litter before closure each day, and placed in wildlife-proof garbage receptacles. Construction personnel shall not feed or otherwise attract any wildlife in the project area. No pets, excluding service animals, shall be allowed in the project area.
MM BIO-5	**Avoid or Minimize Impacts to Special Status Species.** ***California Freshwater Shrimp*:** Prior to commencing construction, trees and vegetation overhanging into the wetted creek channel lining the banks at each restoration site will be surveyed for the presence of undercut root masses (i.e., potential winter habitat). If trees with such features are identified, they will be avoided during construction, as feasible. Avoidance measures will include adjusting grading limits. In addition, construction crews shall be directed to retain riparian vegetation near the margins of the low flow channel, as feasible. Avoidance measures may include adjusting grading limits and reducing the area of flow diversions. Large wood structures shall be placed and constructed to avoid existing habitat to the greatest extent feasible. If relocation is required, a qualified USFWS and CDFW-approved biologist will perform the relocation of California freshwater shrimp, according to the following measures: a. At least 15 days prior to the onset of activities, the name(s) and credentials of biologists who will conduct California freshwater shrimp survey and relocation activities shall be submitted to the USFWS and CDFW for approval. b. No in-channel work activities shall begin until proponent has received written approval from the USFWS and CDFW that the biologist(s) is qualified to conduct the work, and take authorization has been secured under FESA Section 7 and CESA Section 2081. c. Before removal and relocation begins, the biologist shall identify the most appropriate release location(s). Suitable habitat is defined as creek sections that will remain wet over the summer and where banks are structurally diverse with undercut banks, exposed fine root systems, overhanging woody debris, or overhanging vegetation. d. California freshwater shrimp shall be captured by hand-held nets [e.g., heavy-duty aquatic dip nets (12-inch D-frame net) or small minnow dip nets] and relocated out of the work area in the net or placed in buckets containing stream water and then moved directly to the nearest suitable habitat in the same branch of the creek. e. No California freshwater shrimp shall be placed in buckets containing other aquatic species. Handling shall be minimized, as feasible. f. California freshwater shrimp shall not be held more than 30 minutes.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM BIO-5 (cont.)	g. Any California freshwater shrimp rescued or relocated shall be reported to the NPS, USFWS and CDFW. h. Release locations should offer ample habitat and should be selected to minimize the likelihood of reentering the work area. To prevent California freshwater shrimp from reentering the work area, the channel will be blocked by placing fine-meshed nets or screens above and below the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked twice daily and cleaned of debris to permit free flow of water. At the completion of in-stream work, all temporary materials would be completely removed. ***California Red-legged Frog and Western Pond Turtle:*** a. The name(s) and credentials of the qualified biologist(s) to act as construction monitors shall be submitted to the USFWS for approval at least 15 days before construction work begins. b. Vegetation shall be cleared to 18 inches prior to conducting surveys for California red-legged frogs. c. No more than 24 hours before initial ground disturbance activities, including grading and excavation, an approved biologist shall conduct onsite monitoring for the presence of California red-legged frog and other special status species with potential to be present, such as western pond turtle, in the area where ground disturbance or vegetation removal shall occur. Areas of dense vegetation may be mowed or trimmed to 18 inches in height, in order to more effectively survey for frogs. d. Vegetation may be cleared to ground level within 24 hours after being cleared for California red-legged frogs. e. At the beginning of each workday that includes initial ground disturbance, including grading, excavation, and vegetation-removal activities, an approved biologist shall conduct onsite monitoring for the presence of these species in the area where ground disturbance or vegetation removal shall occur. Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fence. f. All excavated or deep-walled holes or trenches greater than 2 feet deep shall be covered at the end of each workday using plywood, steel plates, or similar materials. Before such holes are filled, they shall be thoroughly inspected for trapped animals. g. If a special status species is present within the exclusion fence area during construction, work shall cease in the vicinity of the animal, and the animal shall be allowed to relocate of its own volition. If the animal does not relocate of its own volition, the animal shall be relocated in accordance with the California Red-legged Frog Relocation Plan (Appendix E). NPS will be notified about any California red-legged frog sightings and removals. h. The contractor shall maintain the temporary fencing—both exclusion fencing and protective fencing (if installed)—until all construction activities are completed. No construction activities, parking, or staging shall occur beyond the fenced exclusion areas. Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fence. After construction is completed, the exclusion fencing and associated debris shall be removed and stored or disposed of off-site. ***Northern Spotted Owl and Nesting Birds:*** Tree removal activities will be avoided during the nesting season (February 1 to July 31) unless a nesting bird survey shows that no nesting activity is present. Prior to construction, a qualified biologist will conduct a nesting bird survey in the project area and areas within 1/2-mile. The four nearby spotted owl activity centers (Bike Path, McIsaac, Cheda Creek, and Jewel Trail) will be avoided with a buffer of 1/4-mile during the active nesting season. NPS will conduct spotted owl nesting surveys if necessary, according to USFWS protocol. Other nesting birds will be avoided by a suitable buffer determined in coordination with NPS. Construction work may continue outside of the no-work buffer. ***Bats:*** Prior to project construction, a qualified bat biologist shall conduct a pre-construction survey for roosting bats in trees to be removed or pruned and structures to be demolished. If no roosting bats are found, no further action is required. If a bat roost is found, the following measures shall be implemented to avoid impacts on roosting bats. a. If active maternity roosts are found in trees or structures that will be removed or demolished as part of project construction, tree removal or demolition of that structure shall commence before maternity colonies form (generally before March 1) or after young are flying (generally by July 31). Active maternal roosts shall not be disturbed.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM BIO-5 (cont.)	b. If a non-maternal roost of bats is found in a tree or structure to be removed or demolished as part of project construction, the individuals shall be safely evicted, under the direction of a qualified bat biologist and with approval from NPS. Removal or demolition shall occur no sooner than at least two nights after the initial minor site modification (to alter airflow). Departure of the bats from the construction area will be confirmed with a follow-up survey prior to start of construction.
MM VEG-1	**General Native Vegetation Protection.** a. Before construction begins, the project engineer and a qualified biologist will identify locations for equipment and personnel access and materials staging that will minimize riparian vegetation disturbance. b. During construction, as much native understory brush and as many native trees as possible will be retained. The emphasis will be on retaining shade-producing and bank-stabilizing vegetation. Woodrat nests will be avoided. c. All trees to remain during construction within the grading area will be protected and trimmed in the fall or winter, if necessary, to ensure their trunks and/or limbs are not disturbed during construction. d. When heavy equipment is required, unintentional soil compaction will be minimized by using equipment with a greater reach, or using low-pressure equipment. Disturbed soils will be decompacted when work is completed. e. All vehicles and equipment entering each project site (Sites 1, 2, and 3) shall be clean of noxious weeds and free from oil leaks, and are subject to inspection. Noxious weeds could spread between sites as well as from outside the project area. All construction equipment shall be washed thoroughly to remove all dirt, plant, and other foreign material prior to entering and leaving the project area. Particular attention shall be shown to the under-carriage and any surface where soil containing exotic seeds may exist. These efforts are critical to prevent the introduction and establishment of non-native plant species into each project site. Arrangements shall be made for inspections of each piece of equipment before entering each project site, and records of inspections will be maintained. Equipment found operating on the project site that has not been inspected or has oil leaks will be shut down and may be subject to citation. f. Certified weed-free permanent and temporary erosion control measures shall be implemented to minimize erosion and sedimentation during and after construction. g. The project sponsor shall conform to the Federal Seed Act, the Federal Noxious Weed Act, and applicable state and local seed and noxious weed laws. h. Nursery operations where plants are stored, propagated, or purchased must demonstrate implementation of best management practices to reduce pest and pathogen contamination within their nursery. i. Any disturbed and decompacted areas outside the restoration area will be revegetated with locally native vegetation found in the Lagunitas Creek Watershed. j. Revegetated areas shall be protected and cared for, including watering when needed, until restoration criteria have been met under project permits and/or NPDES standards. Revegetated areas shall be monitored in accordance with permit requirements to ensure success criteria are met.
MM VEG-2	**Vegetation Monitoring and Management Plan.** a. SPAWN shall prepare a Vegetation Monitoring and Management Plan in consultation with NPS. The plan shall describe required salvage and replanting protocols prior to and after construction is complete. This plan shall include, but not be limited to, protocols for replanting of vegetation removed prior to or during construction, and management and monitoring of the plants to ensure replanting success. To the extent feasible and within the goals of the restoration project, native riparian vegetation within the project area shall be salvaged prior to construction and replanted after construction is completed. Areas impacted from construction-related activity shall be replanted or reseeded with native trees, shrubs, and herbaceous perennials and annuals from the watershed or nearby watershed under guidance from NPS-PRNS biologists. b. Replanting shall be conducted using NPS standard operating procedures, such as preparation of soil conditions, use of NPS approved native plants, plant protection, irrigation or watering if necessary, and control of aggressive nonnative species. c. SPAWN shall submit the pre-construction survey protocols for all special-status species and the Vegetation Monitoring and Management Plan to NPS for review and approval as part of the Special Use Permit approval.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM VEG-2 (cont.)	d. To the extent feasible, SPAWN shall use local plant materials for revegetation of the disturbed area. The plant materials shall include local cuttings from the local watershed or from adjacent watersheds. The Vegetation Monitoring and Management Plan shall take into account that use of container plants that meet this source criteria may add additional time to the revegetation process in that the materials need to be collected and provided to a contractor well in advance before the expected planting date. This will ensure that the seeds can be collected during the appropriate season and the container plants will be of an appropriate size for out-planting. Using local cuttings can reduce the length of this phase.
MM VEG-3	**Invasive Plants.** The following steps will be taken to minimize the spread of invasive plants in the Lagunitas Creek watershed: a. Construction activities will be planned and laid out to avoid any existing Japanese knotweed as much as possible, with the goal of avoiding all existing patches (this includes any part of the site that would experience disturbance – such as equipment travel, soil movement, significant vegetation removal and rerouting of the creek). b. A 20-foot buffer will be demarcated with orange fencing around these project areas so that no travel will occur within the area of expected above and below ground FAJA growth. SPAWN to provide materials, and NPS to install fencing. c. A Japanese knotweed site (aka FAJA Buffer Zone) is defined as the perimeter of the 2017 survey extent of the site plus a buffer of 20 feet. d. Disturbance is defined as driving across site, excavating, or anything that will render the site more vulnerable to erosion in the future. e. If sites cannot be avoided SPAWN will submit a request and rationale for not being able to avoid the FAJA Buffer Zone. SPAWN will be responsible for any monitoring and treatment of these penetrated zones. Crane mats will be used in the area of movement within the buffer zone. No construction or travel will take place within the 2017 FAJA footprint. This includes no vegetation removal within the small footprint unless approved of by the NPS FAJA point of contact. f. SPAWN will conduct a botanical survey in June for FAJA. The presence of this species will be mapped as a point and an estimation of how large the site is (square meters, % cover, numbers of stems and a column for comments, and another for an estimation whether the site can be avoided). Point data will be sent as a shapefile to NPS and the table in excel. g. Invasive species, identified below, will be treated before the migration of heavy equipment and staging within the project area. The removal of these species will be with manual equipment. The NPS may treat 2017 FAJA patches in autumn of 2018 while construction is occurring. Construction activities and equipment will be away from 2017 FAJA sites so NPS can treat the patches when appropriate. SPAWN will be responsible for the treatment of non-FAJA invasive species by manual removal. Many invasive species are growing on the disturbed fill pads where old structures were located. These include bull thistle, poison hemlock, Himalayan blackberry, and periwinkle (vinca). SPAWN will work to prevent these species from seeding onto the site prior to construction activities through cutting, mowing, and manual pulling. During the grubbing phase of the project, SPAWN will work with the contractor(s) to scrap the topsoil from the fill pads and carefully discard these spoils and transport the material to a landfill where the material can be capped. Removal of the seed bank of these invasive species will help prevent the recolonization of these plants following construction. h. Any patches of Japanese knotweed that cannot be avoided will be excavated to a depth of 10 feet and a perimeter of 20 feet from the edge of the population. Any excavations will be backfilled with local, native soil. Material will be buried to a depth of 15 feet and filled and compacted with native soil on site. The footprint of this activity will be scraped to a depth of 3” to skim any material dropped – or – if this is considered too onerous, an approved containment of the material during the migration process should be outlined and NPS approved three months before the start of the project. i. If there is no other option but to work within the FAJA buffer zone, SPAWN will provide written plans and justifications for not being able to adhere to this activity and how alternatives were considered. Both a NPS and SPAWN representative will replace orange fencing to accommodate this adjustment. SPAWN shall notify NPS of the construction schedule 3 weeks in advance of activity to allow NPS to observe and monitor as seen fit Excavation of FAJA will require a full time NPS monitoring and documentation. j. SPAWN will coordinate with NPS to have the FAJA patches within the project area treated with herbicide by NPS crews during construction activities when it is most optimal for herbicides to be effective.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM VEG-3 (cont.)	k. NPS Monitoring is secondary to a SPAWN biomonitor, however, the selection of the monitor should have solid experience in monitoring construction projects for biological concerns. NPS should be given a minimum of a two week notice on schedule so that NPS visits to the site can be planned in advance. l. SPAWN monitor should keep the NPS contacts apprised on a weekly basis and if there are problems or concerns all park contacts should be emailed. In particular, any unexpected actions should be included in this report (emergency actions). All other changes need to go through the approval process outlined by the park. m. All methods proposed for FAJA mitigation are the ultimate responsibility of SPAWN and will be researched thoroughly well in advance of project dates (e.g. fumigation, incineration, working with County on options, etc.). n. SPAWN should keep all contractors apprised of any herbicide activity that is planned. o. Following construction, SPAWN will coordinate post-construction monitoring with NPS and conduct surveys for Japanese knotweed along the riparian area as an element of the project's effectiveness monitoring plan. Surveys will include the sites and the downstream areas of influence created by the new structures (minimum of ¼ river mile). p. SPAWN will participate in monthly monitoring from March to July of FAJA growth at the restoration sites as a measure of first response to FAJA colonization following construction. This will include surveys for sprouts and documentation of their proximity to the OHWM and estimated stem count. If any new patches are found within the SPAWN project sites, SPAWN will document these with GPS and submit to NPS. If SPAWN or NPS documents new FAJA patches within the project sites that are below the OHWM, SPAWN will implement a manual treatment regime consistent with the NPS protocol of carful removal of entire root masses and lateral roots by hand and discard into black plastic garbage bags. This treatment will occur monthly. If new patches are discovered above the OHWM, NPS may apply herbicide treatment when optimal. SPAWN shall be responsible for monitoring FAJA within the project footprints and treating manually if new patches are found below the OHWM for a period of 5 years following construction. q. SPAWN should be cognizant of the potential for movement of FAJA from MMWD's site 1 and 2 just upstream. Survey's should be conducted for 5 years after the restoration activities. r. All activities shall be approved by the Water Quality Control Board, California Department of Fish and Wildlife, and PORE staff. s. Care for other key non-natives on site: 1. Himalayan blackberry 2. Greater periwinkle 3. Montbretia or Crocosmia 4. Bull thistle 5. Poison hemlock 6. Forget-me-not ***NPS Staff will provide:*** a. SPAWN with a schedule of herbicide applications, safety data sheets and herbicide labels, and details around re-entry times. SPAWN will be responsible for working with contractors and staff to ensure this is communicated and re-entry is clear. b. One primary project manager for the restoration projects that will attend meetings, and be able to provide insight on the group of cross-discipline issues. This project manager will need to provide updates to the NPS staff and ensure that NPS has representation at meetings. c. GPS points and other data on Japanese knotweed will be provided to SPAWN. SPAWN will continue to coordinate and collaborate with NPS on NPS's Japanese knotweed eradication efforts on NPS lands within the Lagunitas Creek watershed. d. NPS will make spontaneous visits and will be equipped with proper PPE (hard hats, vests, etc). ***General Suggestions to be vetted by PORE staff:*** a. SPAWN to host pre construction meeting with calendar of events for all PORE and regulator staff. b. Identify a mechanism for reporting issues to park (oil spills, resource concerns, issues with regulators.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM VEG-3 (cont.)	c. Demonstrate they have clear crosswalking of all FAJA sites, and resource concerns via integrated mapping. d. Any change of plans will be approved by the project manager at the park and all parties involved will be notified. e. Clarify for project manager what the scope of authority is and what the process is for stopping construction (if needed). Hopefully this won't be needed, but without this clarity it is ambiguous. f. Identify what repercussions will be if mitigation and agreements to plans are not in accordance with actions. ***Communications:*** a. At the earliest possible juncture, provide park with a preliminary and final map (and shapefiles) of construction zone with all areas identified (access, staging, installation sites, and buffer). The nature of the sites should be well marked (so person interpreting it will know what the proposed action will entail).
MM CUL-1	In the event of any discovery of human remains, archaeological deposits, or any other type of cultural resource during construction, work shall stop work and the National Park Service archaeological staff shall be notified within 24 hours. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include refuse-filled privies or wells. Construction work shall be suspended immediately and shall not resume until the National Park Service re-authorizes project construction. If it is determined that the discovery is eligible for listing in the National Register, and cannot be avoided, the National Park Service will follow the procedures for Post Review Discoveries 36 CFR 800.13. If human remains are discovered, SPAWN shall implement measure MM CUL-2.
MM CUL-2	In the event of discovery or recognition of any human remains during construction activities, such activities within 100 feet of the find shall cease until the Marin County Coroner has been contacted to determine that no investigation of the cause of death is required. The NPS will be notified in the event of the discovery of human remains. The NPS will follow the procedures for the inadvertent discovery of human remains outlined in 43 CFR 10.4 in compliance with the Native American Graves Protection and Repatriation Act.
MM HAZ-1a	**Pre-Construction Hazardous Materials Assessment.** Prior to construction, the project sponsor shall ensure that a limited soil and/or groundwater investigation is performed at proposed construction work area to characterize soil and/or groundwater quality. The project sponsor shall conduct a site assessment (the "Pre-Construction Hazardous Materials Assessment") including potential testing of soil and/or groundwater, and if testing reveals soil and/or groundwater concentrations that exceed applicable regulatory levels, the project sponsor shall contact the County of Marin or Regional Water Quality Control Board (RWQCB), as appropriate, to secure regulatory oversight and the NPS Senior Environmental Planner shall be notified. The Pre-Construction Hazardous Materials Assessment may include the following: analysis of subsurface soil samples within the project site for total petroleum hydrocarbons (as gasoline, diesel, and waste oil), Title 22 metals, and volatile organic compounds (VOCs) or any other chemicals of concern to evaluate the potential presence of contamination; and groundwater samples if subsurface excavations are anticipated to require dewatering. In the case of LBP, the identification, removal, and disposal is regulated under Section 8 California Code of Regulations (CCR) 1532.1. The results of the Pre-Construction Hazardous Materials Assessment shall be incorporated into the Site Health and Safety Plan prepared in accordance with Mitigation Measure HAZ-1b and the Soil and Groundwater Management Plan prepared in accordance with Mitigation Measure HAZ-1c to determine whether: specific soil and groundwater management and disposal procedures for contaminated materials are required; excavated soils are suitable for reuse; and construction worker health and safety procedures for working with contaminated materials are required. If the pre-construction hazardous materials assessment identifies the presence of soil and/or groundwater contamination at concentrations in excess of applicable regulatory screening levels (Environmental Screening Levels [ESLs] or California human health screening levels [CHHSLs]) for proposed site use, the project sponsor or its contractor shall complete site assessment and remedial activities required by the regulatory agency to ensure that residual soil and/or groundwater contamination, if any, shall not pose a continuing significant threat to groundwater resources, human health, or the environment. A copy of the pre-construction hazardous materials assessment shall be submitted to the NPS Senior Environmental Planner for approval.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM HAZ-1b	**Health and Safety Plan.** SPAWN shall retain a qualified environmental professional to prepare a site-specific Health and Safety Plan (HASP) in accordance with federal OSHA regulations (29 CFR 1910.120) and Cal/OSHA regulations (8 CCR Title 8, Section 5192). SPAWN shall require the contractor to comply with the HASP. Because anticipated contaminants vary depending upon the location of proposed improvements in the project area and may vary over time, the HASP shall address site-specific worker health and safety issues during construction. The HASP shall include the following information: a. Results of sampling conducted in accordance with Mitigation Measure HAZ-1a. b. All required measures to protect construction workers and the general public by including engineering controls, monitoring, and security measures to prevent unauthorized entry to the construction areas and to reduce hazards outside of the construction areas. If prescribed contaminant exposure levels are exceeded, personal protective equipment shall be required for workers in accordance with state and federal regulations. c. Required worker health and safety provisions for all workers potentially exposed to contaminated materials, in accordance with state and federal worker safety regulations, and designated qualified individual personnel responsible for implementation of the HASP. SPAWN shall require the contractor to have a site health and safety supervisor fully trained pursuant to hazardous materials regulations be present during excavation, trenching, or cut and fill operations to monitor for evidence of potential soil contamination, including soil staining, noxious odors, debris or buried storage containers. The site health and safety supervisor must be capable of evaluating whether hazardous materials encountered constitute an incidental release of a hazardous substance or an emergency spill. The site health and safety supervisor shall implement procedures to be followed in the event of an unanticipated hazardous materials release that may impact health and safety. These procedures shall be in accordance with hazardous waste operations and regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of the unknown hazardous materials release; notifying the County of Marin and retaining a qualified environmental firm to perform sampling, remediation, and/or disposal. SPAWN shall provide documentation that HASP measures have been implemented during construction. Submittal of the HASP to the NPS, or any review of the contractor's HASP by NPS, shall not be construed as approval of the adequacy of the contractor as a health and safety professional, the contractor's HASP, or any safety measure taken in or near the construction site. The contractor shall be solely and fully responsible for compliance with all laws, rules, and regulations applicable to health and safety during the performance of the construction work. A copy of the HASP shall be submitted to the NPS Senior Environmental Planner for approval.
MM HAZ-1c	**Soil and Groundwater Management Plan.** If ground-borne hazardous materials are identified under the Pre-Construction Hazardous Materials Assessment, prepared in accordance with Mitigation Measure HAZ-1a, SPAWN shall require the construction contractor to prepare and implement a Soil and Groundwater Management Plan, subject to review by the NPS Senior Environmental Planner, that specifies the method for handling and disposal of contaminated soil and groundwater prior to construction. The plan shall include all necessary procedures to ensure that excavated materials and fluids generated during construction are stored, managed, and disposed of in a manner that is protective of human health and in accordance with applicable laws and regulations. The plan shall include the following information: a. Step-by-step procedures for evaluation, handling, stockpiling, storage, testing, and disposal of excavated material, including criteria for reuse and offsite disposal. All excavated materials shall be inspected prior to initial stockpiling, and spoils that are visibly stained and/or have a noticeable odor shall be stockpiled separately to minimize the amount of material that may require special handling. In addition, excavated materials shall be inspected for buried building materials, debris, and evidence of underground storage tanks; if identified, these materials shall be stockpiled separately and characterized in accordance with landfill disposal requirements. If some of the spoils do not meet the reuse criteria and/or debris is identified, these materials shall be disposed of at a permitted landfill facility. b. Procedures to be implemented if unknown subsurface conditions or contamination are encountered, such as previously unreported tanks, wells, or contaminated soils. c. Procedures for containment, handling and disposal of groundwater generated from construction activities, the method to be used to analyze groundwater for hazardous materials likely to be encountered and the appropriate treatment and/or disposal methods.

TABLE 2-5 (CONTINUED)
MITIGATION MEASURES

Mitigation	Description
MM HAZ-2	SPAWN shall identify underground utility lines such as natural gas, electricity, and water lines that may be encountered during excavation work. Information regarding the size, type, and location of existing utilities will be confirmed by the utility service provider. If such underground utility lines are identified, a plan that outlines construction methods and protective measures to minimize impacts on aboveground and belowground utilities shall be prepared. Construction shall be scheduled to minimize or avoid interruption of utility services to customers. Disconnected utility lines shall be promptly reconnected.
MM HAZ-3	The project sponsor shall ensure that the following fire safety construction practices are implemented: a. Earthmoving and portable equipment with internal combustion engines shall be equipped with a sparks arrestor to reduce the potential for igniting a wildland fire; b. Appropriate fire suppression equipment shall be maintained at the construction site; c. Flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame; and d. Construction personnel shall be trained in fire safe work practices, use of fire suppression equipment, and procedures to follow in the event of a fire.
MM TRAF-1	SPAWN shall require the construction contractor(s) to hire a qualified traffic engineer to prepare a traffic control plan (TCP) for Sites 1, 2, and 3, in accordance with professional engineering standards, and submit the TCP to the County of Marin Public Works Department for review and approval. The TCP shall be developed on the basis of detailed design plans for the approved project, and shall include, but not necessarily be limited to, the elements listed below: a. Schedule grading and excavation activity at Sites 1 and 2 to minimize the overlap of haul truck trips from both sites; b. Schedule construction activities to minimize traffic impacts during heavy recreational use periods (e.g., weekends and holidays); c. To the extent feasible, reduce truck trips during the peak morning and evening commute hours to minimize adverse impacts on traffic flow; d. Store all equipment and materials in designated contractor staging areas; e. Comply with roadside safety protocols to reduce the risk of collisions. Provide “Trucks Entering Roadway” warning signs in advance of project work sites. Train construction personnel to apply appropriate safety measures as described in the traffic control plan.
Additional Initial Study Mitigation Measure	
MM AIR-1	During restoration activities, the following BAAQMD-recommended measures shall be implemented to control fugitive dust and NOx emissions: 1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day. 2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered. 3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping shall be prohibited. 4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour. 5. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points. 6. All construction equipment shall be maintained and properly tuned in accordance with manufacturer’s specifications. 7. The project shall be carried out in accordance with a plan, to be developed prior to project commencement, that provides for the off-road equipment (more than 50 horsepower) used in the construction project (i.e., owned, leased, and subcontractor vehicles) to achieve a project wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent Air Resources Board (ARB) fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

2.5 Permits and Approvals

The project would affect lands and resources under the jurisdiction of multiple regulatory agencies. As a result, numerous federal, state, and local authorizations and permits would be required for project implementation. The following is a list of potentially affected agencies and the corresponding type of approval that may be required.

1. **U.S. Army Corps of Engineers (USACE):** A Section 404 Clean Water Act (CWA) permit and a Section 10 Rivers and Harbors Act (RHA) permit would be required for placement of dredge or fill material into waters of the United States and work within navigable waters respectively. The project will apply for Section 404 coverage under the Nationwide Permit Program, Permit Number 27, Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

2. **National Marine Fisheries Service (NMFS):** Federal Endangered Species Act (FESA) compliance would be required for potential effects on anadromous fish species federally listed as threatened or endangered. The NPS will lead consultations with NMFS.

3. **U.S. Fish and Wildlife Service (USFWS):** FESA compliance would be required for potential effects on wildlife and resident aquatic species federally-listed as threatened or endangered. Additionally, compliance with the Migratory Bird Treaty Act (MBTA) would be necessary to protect active nests of native birds. The NPS will lead consultations with USFWS.

4. **San Francisco Bay Regional Water Quality Control Board (RWQCB):** Water Quality Certification in accordance with Section 401 of the CWA; and Waste Discharge Requirements in accordance with the Porter-Cologne Water Quality Control Act. Approval for coverage under the CWA Section 402 National Pollutant Discharge Elimination System Construction General Permit for construction-related ground disturbing activities over one acre would also be required.

5. **California Department of Fish and Wildlife (CDFW):** A Lake or Streambed Alteration Agreement, in accordance with Section 1602 of the California Fish and Game Code, would be required for work within the bed, channel, or bank of Lagunitas Creek. Additionally, take coverage for species protected by the California Endangered Species Act (CESA) may be provided under an incidental take permit (ITP) issued by CDFW.

6. **California State Historic Preservation Office (SHPO):** National Historic Preservation Act (NHPA) implementing regulations, as set forth in Title 36 Code of Federal Regulations (CFR) Parts 800 et. seq., require federal agencies to take into account the effects of their undertakings on historic properties and consult with stakeholders, including the SHPO, on potential effects to resources that are listed or eligible for listing in the National Register of Historic Places. The NPS will lead consultations with the SHPO.

7. **Marin County:** Creek Permit, Grading Permit, and Encroachment Permit may be required for the project. Encroachment permits are for activities that alter or use areas within County right-of-ways. Marin County will not require a creek or grading permit since the project construction will occur on federal lands. However, an encroachment permit will be required for construction traffic controls on Sir Frances Drake Boulevard.

8. **National Park Service: Special Use Permit** Authorization for the project would be through a NPS Special Use Permit to be issued based upon the findings of the NEPA process.

2.6 Actions Considered but Eliminated from Further Evaluation

The following preliminary alternatives or concepts were initially considered but have been dismissed and will not be carried forward for analysis. As a result, these alternatives were not carried forward for evaluation in this document. This section briefly explains the alternatives that were eliminated from further evaluation for the following reasons:

1. The alternative would require construction and/or maintenance activities that are beyond the scope of the project.
2. The alternative does not meet the project purpose or resolve the project need to a large degree.
3. The alternative would be inconsistent with project goals and objectives.
4. The alternative would be technically or economically infeasible, or not implementable.
5. A similar or better option is included in the alternatives (i.e., there is a less environmentally damaging, less expensive, or more optimal alternative) that would achieve the same result.

2.6.1 Cheda Creek Culvert Modification and Channel Restoration

The thirteen (13) culverts along Sir Francis Drake Blvd adjacent to the study area convey flows from a variety of sources including run-off from the roadway, grazed lands, small ephemeral stream channels, and Cheda Creek. The Cheda Creek culvert allows for unimpeded fish passage, but was ranked #14 in a 2003 report that assessed stream barriers in Marin County (Ross Taylor and Associates, 2003). While fish passage is possible under current conditions, the culvert is in poor condition and undersized. In particular, our observations suggest that the slope transition above and through Sir Francis Drake is abrupt and may be limiting the downstream transmission of sediment. This coarse sediment would likely contribute to the formation of a larger alluvial fan that may influence channel morphology over time. This culvert could be retrofitted or replaced to improve fish passage and sediment transport in Cheda Creek under Sir Francis Drake Blvd.

This alternative would potentially cost over $500,000 to implement and would result in a smaller length of restored habitat along Lagunitas Creek compared to the project.

2.6.2 In-channel Streamwood and Vegetation Management

These actions are small scale “maintenance” activities aimed at improving and enhancing existing channel conditions in the project reach. Example actions include the selective modification of streamwood jams and bankside vegetation to improve physical channel conditions using mostly hand tools and smaller equipment.

The channel at this location is relatively uniform so the opportunity to engage the large diameter trees with the active channel exists. This action would entail cutting and/or winching the existing trees into an appropriate configuration in the channel. This action would be expected to create a

channel pool above or below the logs, depending on the configuration and orientation of the logs. This option may not be feasible when construction would occur due to geomorphic changes to the stream channel and adjacent wood features.

In at least three locations flatwater/glide habitat types could be "broken up" into more complex channel conditions through the selective removal of bank vegetation. This would involve removing young bankside vegetation such as willow, bay or alder species from alternating banks at a distance of 3-6 channel widths. The trees removed could also be used for salmonid rearing or freshwater shrimp habitat enhancement measures at other bank locations. Overall these actions would increase channel complexity so that bar and pool channel morphology can begin to establish.

This alternative would not address the primary limiting factor for Coho salmon, which is the lack of floodplain habitat due to historic fill.

2.6.3 Site 3 Structure Removal

Initial scoping of the project proposed removing all structures and restoring the full floodplain at Site 3. Due to timing constraints and additional compliance requirements for the structure removal, full evaluation of the structure removal was not considered at this time. However, restoration designs are available for this site to complete full restoration objectives in the future if necessary.

2.7 Environmentally Preferred Alternative

The Council on Environmental Quality (CEQ) Regulations implementing NEPA and the NPS NEPA guidelines require identification of "the alternative or alternatives which were considered to be environmentally preferable" (40 CFR 1505.2). CEQ defines the environmentally preferable alternative as "the alternative that would promote the national environmental policy as expressed in NEPA Section 101." As stated in NEPA section 101(b), "…it is the continuing responsibility of the Federal Government to... (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations; (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings; (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences; (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice; (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

The project's purpose and need (as described in Chapter 1, Purpose and Need for Action) satisfies these criteria. The purpose and need for this project emphasizes natural resource protection, as well restoring a beneficial use of the environment by responsibly managing and maintaining sensitive habitats in the national park. Because the goals and objectives of the project correlate with these criteria, analyzing which alternative best meets the project purpose and need would also determine which alternative is environmentally preferred. Using this analysis approach, it was determined that Alternative A is the environmentally preferred alternative. Provided below is a summary of how the

action alternatives meets the stated purpose of the project. Because Alternative B (No Action) does not meet the project purpose and need, it is not the environmentally preferred alternative.

Table 2-6 provides a summary of the project elements for the project alternatives considered in this analysis.

TABLE 2-6
COMPARISON OF ALTERNATIVES

Project Element	Alternative A	Alternative B
Site 1		
Removal of Residential Structure Remnants and Former Fill	The existing residential structure remnants and former fill would be removed.	The existing residential structure remnants and former fill would remain unchanged.
Floodplain Enhancement	A floodplain area would be created behind the new 'mid-channel bar' within a new secondary channel, which would restore channel/floodplain hydrologic connectivity and provide habitat.	The existing fill area would remain unchanged.
Biotechnical Bank Stabilization Measures	Brush mats would be installed at cut banks along the back of the newly graded floodplain.	The existing fill area would remain unchanged.
Secondary Channel Creation	An ephemeral secondary channel would be created within the new floodplain area. Live wood structures would be installed along edges of new channel.	The existing fill area would remain unchanged.
In-channel Enhancements	Woody debris would be placed at select and appropriate locations on the channel edge.	Channel edge would remain unchanged.
Vegetation Removal and Management	Invasive and non-native plant species in the project site would be removed. All disturbed areas would be revegetated with appropriate native riparian plant species.	No invasive and non-native plant species removal would occur.
Site 2		
Removal of Residential Structure Remnants and Former Fill	The existing residential structure remnants and former fill would be removed.	The existing residential structure remnants and former fill would remain unchanged.
Floodplain Enhancement	Floodplain footprint would be expanded to create transitional habitat; backwater alcove would be created; grading at the upstream of the backwater alcove would enhance the drainage pathway from an existing culvert outfall.	The existing fill area would remain unchanged.
Biotechnical Bank Stabilization Measures	Bank protection measures would be installed.	The bank would remain unchanged.
In-channel Enhancements	Large wood structures would be placed at the connections to the Lagunitas Creek channel and live pole habitat structures would be installed along the edge of the new alcove.	Channel edge would remain unchanged.
Vegetation Removal and Management	Invasive and non-native plant species in the project site would be removed.	No invasive and non-native plant species removal would occur.
Site 3		
Vegetation Removal and Management	Invasive and non-native plant species in the project site would be removed.	No invasive and non-native plant species removal would occur.

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CHAPTER 3
Environmental Consequences

Introduction

NEPA requires that environmental documents disclose the environmental impacts of a proposed federal action, reasonable alternatives to that action, and any adverse environmental effects that cannot be avoided should the Lagunitas Creek Floodplain and Riparian Restoration Project (proposed project) be implemented. This EA analyzes the environmental effects associated with two distinct alternatives: Action Alternative (Alternative A) and No Action (Alternative B). NEPA requires consideration of potential direct, indirect, and cumulative impacts of actions and adverse and beneficial impacts.

General Methodology

This EA assesses both direct impacts (an effect that is caused by an action and occurs at the same time and place) and indirect impacts (an effect that is caused by an action but is later in time or farther removed in distance, but still reasonably foreseeable). The analysis of environmental impacts considers the context, duration, nature, and type of impact, as defined below.

Context

The context of the impact considers whether the impact would be local or regional. For the purposes of this analysis:

1. ***Local impacts*** would generally be those that occur within the immediate vicinity of the proposed project.

2. ***Regional impacts*** would be those that occur within the greater Point Reyes National Seashore or within surrounding areas.

Duration

The duration of the impact considers the amount of time that an impact would affect a given resource:

1. ***Short-term impacts*** are temporary, transitional, or construction-related impacts associated with project activities.

2. ***Long-term impacts*** last several years or more or would be permanent.

Nature of Impact

Impacts were evaluated in terms of whether they would be beneficial or adverse.

1. ***Beneficial impacts*** would improve resources/conditions by halting or reversing the adverse effects of human activities on riparian conditions.

2. ***Adverse impacts*** would continue or worsen the historical impacts of humans on natural physical processes, or if the project introduces new stresses in the system.

A brief methodology for assessing specific impacts is defined under each impact topic.

Type of Impact

Impacts were evaluated in terms of whether they would be beneficial or adverse.

1. ***Direct impacts*** are caused by the action and occur at the same time and place.

2. ***Indirect impacts*** are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.

3. ***Cumulative impacts*** are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions" (40 Code of Federal Regulations [CFR] §1508.7). Cumulative impacts are addressed for all of the alternatives considered.

   Actions identified by NPS that have the potential to have a cumulative impact in conjunction with the project include those projects listed in Table 2-4 in Chapter 2, *Alternatives*.

3.1 Soils and Water

3.1.1 Introduction

This section describes the existing setting for soils, water resources, water quality, and wetlands and other waters of the U.S. as it relates to the proposed project sites within Lagunitas Creek. In addition, this section describes the applicable laws, regulations, and policies and evaluates potential impacts of the project related to watershed hydrology and soils.

3.1.2 Regulatory Framework

The Clean Water Act (CWA) (33 U.S.C. 1251 et seq.), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's Waters." Numerous agencies have responsibilities for administration and enforcement of the CWA. At the federal level this includes the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers (USACE), the Bureau of Reclamation, and the major federal land management agencies such as the National Park Service (NPS), U.S. Forest Service, and the Bureau of Land Management. At the state level, with the exception of tribal lands, the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB), are delegated primary responsibility for administering and enforcing the CWA in California. Important sections of the CWA and other regulations relevant to water quality protection and hydrology are summarized in **Table 3.1-1**.

3.1.3 Affected Environment

Watershed Geography

The project site is located at Tocaloma and Jewell, unincorporated areas in Marin County, at approximately river mile 6.4 of Lagunitas Creek, measured from the Highway 1 Bridge in Point Reyes Station. The downstream limit of the project area is the SPAWN office and extends upstream approximately 4,500 feet to the border of Samuel P. Taylor State Park. Located approximately in the center of the Lagunitas Creek watershed, the project reach sits 10 miles upstream from Tomales Bay and 14 miles downstream from the uppermost headwaters of Cataract Creek. Lagunitas Creek drains much of west-central Marin County and represents the largest watershed in the County, encompassing a 103-square-mile drainage area.

Four reservoirs operated by the MMWD are located along the upper eight miles of the Creek, the fourth and largest of which is Kent Lake. Formed by Peters Dam, which was built in 1954 and raised in 1982, Kent Lake holds approximately 32,900 acre-feet of water. Downstream of Kent Lake, Lagunitas Creek flows another 12 miles where it is joined by several unregulated (i.e., undammed/free-flowing) tributaries including San Geronimo Creek, Irving Creek, Barnabe Creek, Deadman's Gulch, Devil's Gulch, Cheda Creek, McIsaac Creek, and Olema Creek. The other major tributary is Nicasio Creek, which is impounded by MMWD's Nicasio Reservoir (formed by Seeger Dam, built in 1960) (MMWD, 2011). Lagunitas Creek and Olema Creek meet

TABLE 3.1-1
LAWS AND REGULATIONS RELATED TO WATER QUALITY AND HYDROLOGY

Law or Policy	Responsible Federal Agency	Description
CWA Section 303(d) – Impaired Waters and TMDLs	SWRCB and RWQCB	Requires evaluation of water bodies not meeting water quality standards and establishment of Total Maximum Daily Loads (TMDLs) and implementation plans to reduce pollutants concentrations or water quality stressors. A sediment TMDL was adopted by the RWQCB in 2014. The proposed project is being implemented to achieve the TMDL's fine sediment reduction, water quality improvement, and habitat enhancement goals for Lagunitas Creek.
CWA Section 401 – Water Quality Certification	SWRCB and RWQCB	Requires water quality certification or a waiver for federal permits that may result in discharge to waters of the United States. The RWQCB administers CWA Section 401 in the project area.
CWA Section 401 – National Pollutant Discharge Elimination System Program	SWRCB and RWQCB	Regulates stormwater discharges, including from construction activities. Compliance with *NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities* (Order 2009-0009-DWQ, NPDES No. CAS000002; as amended by Orders 2010-0014-DWQ and 2012-006-DWQ) is required for ground disturbing activities one (1) acre or larger to avoid and minimize water quality impacts. Compliance with this permit would be completed by the project construction contractor.
CWA Section 404 – Discharge of Dredged or Fill Material	USACE	Under Section 404 of the Clean Water Act, the USACE regulates the discharge of dredged and fill materials into waters of the U.S. A permit is required for dredging and fill in jurisdictional waters and wetlands. The project will apply for Section 404 coverage under the Nationwide Permit Program, Permit Number 27, *Aquatic Habitat Restoration, Establishment, and Enhancement Activities*.
NPS Management Policies 2006	NPS	States that the NPS will "preserve and protect geologic resources as integral components of park natural systems." Before interfering with geologic processes that are potentially hazardous, superintendents will consider other alternatives.
Executive Order 11988 and Director's Order 77-2 for Floodplain Management	NPS	Directs NPS "to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative." The goals of the project are in accordance with both the executive order and director's order to protect and preserve the natural resources and functions of floodplains and restore natural floodplain values previously affected by land use.
Director's Order 77-1 Wetland Protection	NPS	Adopts a no net loss policy. The proposed project is considered a restoration project with beneficial affects to wetland resources, thus a Statement of Findings is not required (exempted). Consistent with DO 77-1 Statement of Findings exemption, the project will implement the Best Management Practices (BMPs) found in Procedural Manual 77-1: Wetland Protection (NPS, 2016). The list of BMPs is included in **Appendix A**.
Central California Coast Coho Salmon Recovery Plan	National Oceanic and Atmospheric Administration (NOAA) Fisheries	The Recovery Plan provides the foundation for restoring Coho populations to healthy levels. The Recovery Plan presented recommendations for Lagunitas Creek that have been included in the proposed project

SOURCE: ESA, 2016, Sacramento Railyards Specific Plan Update, KP Medical Center, MLS Stadium, & Stormwater Outfall, Draft Subsequent Environmental Impact Report, June

in the estuary, at the restored Giacomini Wetlands, where a vast area of former dairy pasture was reopened to tidal action in 2008, restoring vital estuary habitat (KHE, 2014).

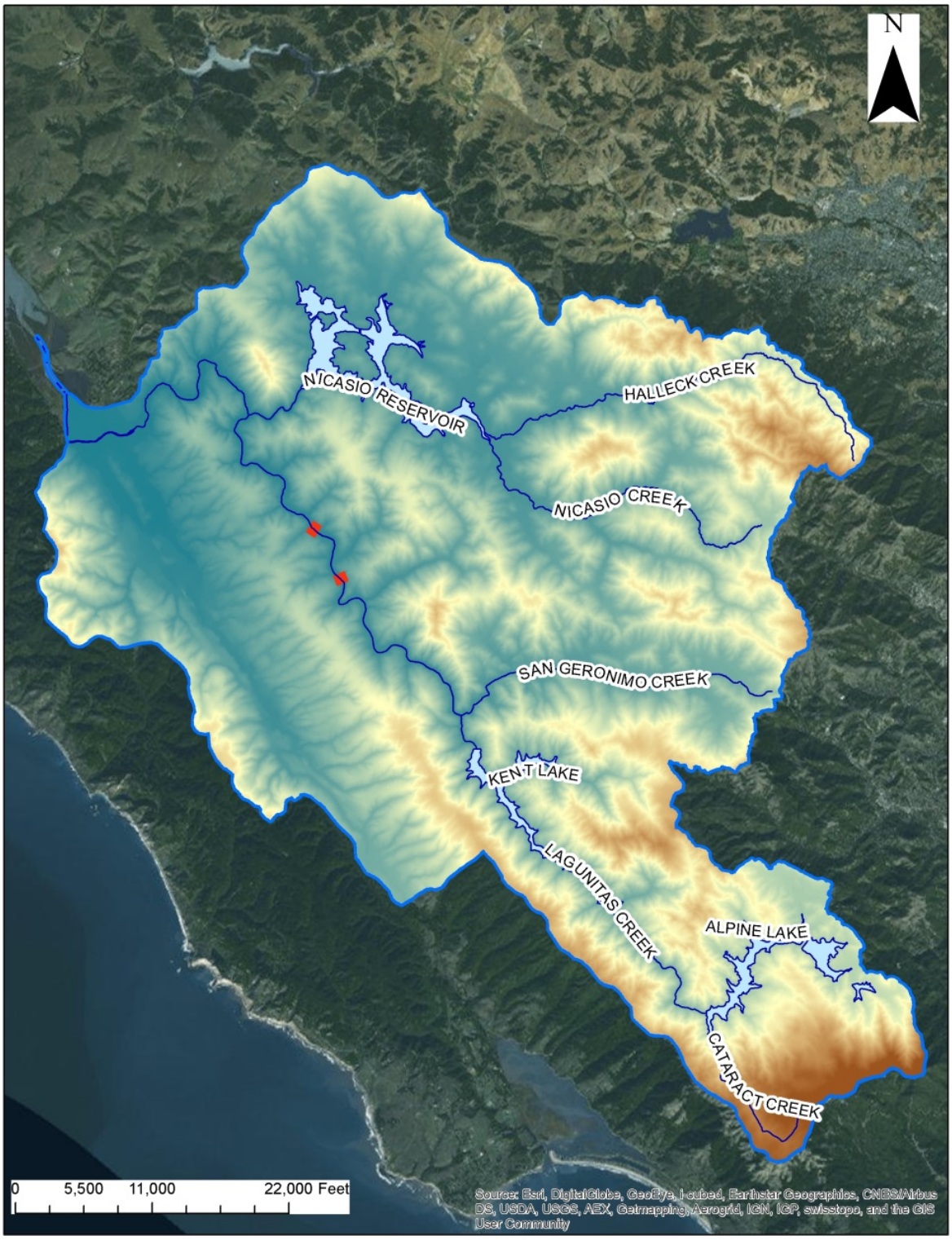
The Lagunitas Creek basin has a complex drainage network related to variations in underlying geology and the presence of nearby faults (Balance, 2010). The project is located on the north side of San Francisco Bay, within the Coast Ranges geomorphic province of California near the San Andreas fault and the Hayward-Rogers Creek fault, and is susceptible to ground shaking in the event of an earthquake. The San Andreas Fault is located three miles to the west, and the Hayward-Rogers Creek fault is located 17 miles to the east of the project sites (CGS, 2017).

The geology of Lagunitas Creek is primarily composed of bedrock formations known as Franciscan mélange, Franciscan complex (sandstone and shale, greenstone), alluvium, coast range ophiolite and serpentine lithologies. Within the project reach of Lagunitas Creek, the underlying geology is primarily Franciscan mélange which is a mixture of large blocks of varied rocks that formed before faulting brought them together. Soil types found within the project sites, including Cronkite-Barnabe complex, and Tocaloma-Saurin association, occur primarily between the Creek and the Sir Francis Drake ROW (NRCS, 2017). Slope gradients in the watershed are steep, exceeding 30% in most areas, with gentle gradients of less than 5% composing less than 9% of the sub-watersheds. The elongated shape of the watershed is a product of the structural trend of the geology, which is heavily influenced by the northwest-trending San Andreas Fault Zone, on the western side of the watershed area depicted in **Figure 3.1-1**, Lagunitas Creek Watershed. Bedrock geology is an important control on the longitudinal profile of Lagunitas Creek, whereby resistant layers represent barriers to further incision and migration of headcuts. The terminus of Lagunitas Creek is in Tomales Bay, which is a drowned river valley created by the San Andreas fault and sea levels that have risen since the end of the Pleistocene (over 11,000 years ago).

Watershed Conditions and History

The watershed is located in an area characterized by a Mediterranean climate, with dry summers and wet winters. Climate events drive much of the sediment delivery within the watershed. Storms usually enter the watershed from the west, coming from the Pacific coast. Rainfall primarily occurs from November through March, with mean annual rainfall ranges from 30 to 55 inches.

Two large flood events occurred within the last century. Based on evidence from available river gaging stations in Marin County and historical narratives from the Muir Woods National Monument, the January 4, 1982, event may have been the largest flow event in the County since an event on February 11, 1925 (SWS, 2010). While these two events may have had significant impacts on channel distribution and floodplain extents, landscape changes resulting from geomorphic processes can take significant time periods to complete. For example, the morphology of the middle and lower portions of Lagunitas Creek is likely to still be in the process of adjusting to the changes in sediment source areas and the altered flow regime imposed by dams and other human disturbances with the watershed.



SOURCE: Hydrography from http://www.atlas.ca.gov.; Terrain data from 10m National Elevation Dataset.

NOTE: Map does not include Olema

Figure 3.1-1
Map of the Lagunitas Creek Watershed
(The proposed project reach is located between the two red lines that bisect Lagunitas Creek.)

Project Area Conditions and History

A group of twelve houses were built in the 1930s to early 1940s as summer homes on the land between Sir Francis Drake Boulevard and Lagunitas Creek. Specifically, several structures were built in the 1930s on the property (9249 Sir Francis Drake Boulevard) including a concrete patio, boat ramp, and a seasonal dam structure that was installed each summer. The dam created a wide pool that extended to the southern-most property and was used for recreation. The remaining portions of the property were landscaped with non-native vegetation including gardens of fruit trees, flowers, and other ornamental species.

The project reach is currently considered an incipient floodplain based on changes in bed slope and valley width. This means it is one of the first areas in the creek corridor where moderate floodplain habitat exists, which further strengthens its importance in managing Coho Salmon populations. Overall, it appears the Tocaloma reach is a medium energy floodplain in a partially confined valley. These valleys commonly have anabranching[1] channels. It is uncertain as to whether they did exist historically, but these are currently not present in the project reach. This may be due to reductions in bedload sediment, woody material, and peak flows from upstream land uses.

Locally, the Tocaloma reach appears to be within a sediment transfer zone of the Lagunitas Creek watershed. Sediment transfer zones lie between sediment producing headwaters and depositional lowlands. This is in one of the first zones where sediment, especially finer fractions, wood and other inorganic and organic materials can deposit in flood flows due to increases in valley width, and decreases in channel slope. Thus, this area is predominantly depositional but may rework material with no significant aggradation or degradation. The segment below Tocaloma Bridge is a highly depositional zone governed more by log jams than typical fluvial geomorphic mechanisms such as point bar formation (Balance, 2010).

Observations suggest the floodplain is vertically accreting more than laterally migrating. Sediment transfer seems partially decoupled, in that coarse sediment is not exchanged laterally as much as fine sediment is exchanged vertically. Many of the coarse sediment deposits were small wavelength, inset bars that were not connected to the floodplain. Over time this suggests that accretion would outpace migration and the channel could become decoupled from the floodplain. It is possible that infilling discussed above has limited to ability of the channel to adjust laterally in the creek corridor.

[1] An anabranch is a section of a river or stream that diverts from the main channel or stem of the watercourse and rejoins the main stem downstream. Local anabranches can form small islands in the watercourse.

Lagunitas Creek Channel Morphology

The primary constraint on Coho smolt production in the Lagunitas Creek watershed is the amount and quality of winter rearing habitat, which depends in large part on channel morphology (PCI, 2009; SWS, 2008). The frequency and duration of overbank and off-channel flow connectivity is necessary to expand the quantity and improve the quality of wintering habitat for Coho Salmon (KHE, 2013). According to the Kamman 2013 report, two channel types were discovered within the Lagunitas Creek watershed. One type of channel is the "box channel" geometry that exhibits a single threaded, narrow, steep-sided entrenched (incised) box channel shape. The second channel types are shallower, wider, and multithreaded channels with features such as log-jams, longitudinal gravel bars and are generally "better" connected to the adjacent floodplain. Both channel types occur within the project reach, as discussed below.

The project reach lies in the middle of a semi-confined valley expansion that begins as the creek leaves Samuel P. Taylor Park. The channel meanders moderately through the valley floor, alternating sides from the presence of inset terraces, small tributary fans, and from valley steering. These characteristics are commonly associated with partially confined floodplains. Valley widths more than double from where the creek exits the park to just above the Tocaloma bridge. As the valley width increases, the channel sinuosity also increases as there is more room available in the corridor. Finally, the valley width has been cut almost in half at the Site 3 due to development infill, which creates an incised, box-channel geometry. The reduction in floodplain width limits both meandering of the creek and the development of more complex channel features such as alcoves, side channels, and secondary channels.

Channel and floodplain morphology in the project reach of Lagunitas Creek is also affected by the establishment of dense vegetation. Many of the channel bank and floodplain surfaces are densely vegetated as a result of the modified hydrology from dam operations. Higher than normal flows in the summer time have supplied adequate water to support vegetation establishment, and lower than normal flows in the winter limits the erosive energy to remove such established vegetation. Dense vegetation lines the channel banks, preventing the erosion and migration of the channel. On floodplains the vegetation slows flow velocities during overbank flows promoting the deposition and vertical accretion of unconsolidated mixture of fine sand.

Wetlands

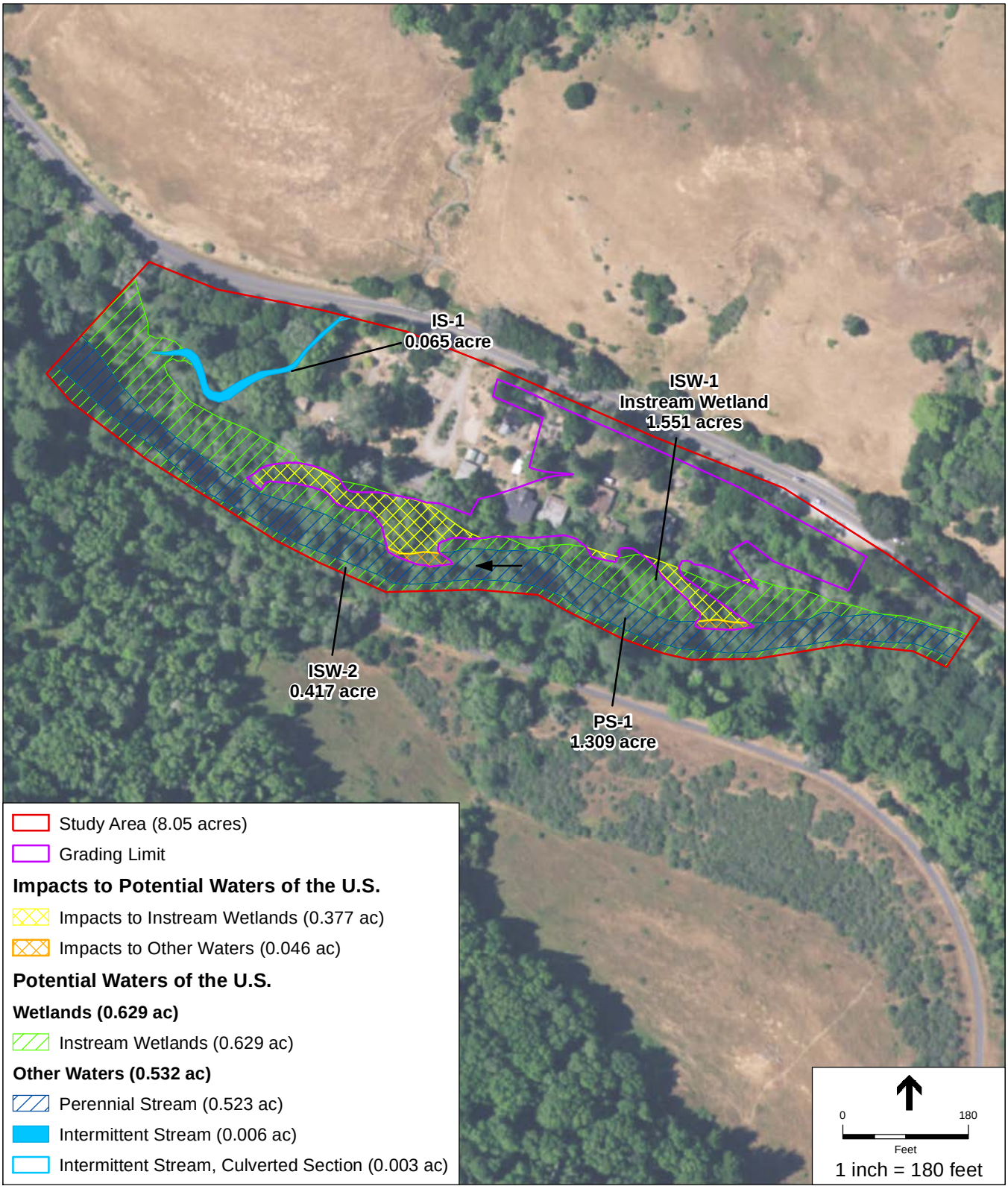
The study area contains a perennial creek, two intermittent streams, and associated riparian habitat along the steep creek banks. The National Wetland Inventory identifies the wetland and riparian corridor along Lagunitas Creek as freshwater forested/shrub wetland (**Figure 3.1-2**) (USFWS, 2017).

A preliminary wetland delineation was prepared for the study area (ESA 2017). **Figures 3.1-3** and **3.1-4** show potentially jurisdictional wetlands and waters of the U.S. delineated within the wetland delineation study area. The jurisdictional delineation has not been verified by the U.S. Army Corps of Engineers.

SOURCE: USFWS NWI Mapper

Figure 3.1-2

National Wetland Inventory In and Surrounding the Study Area

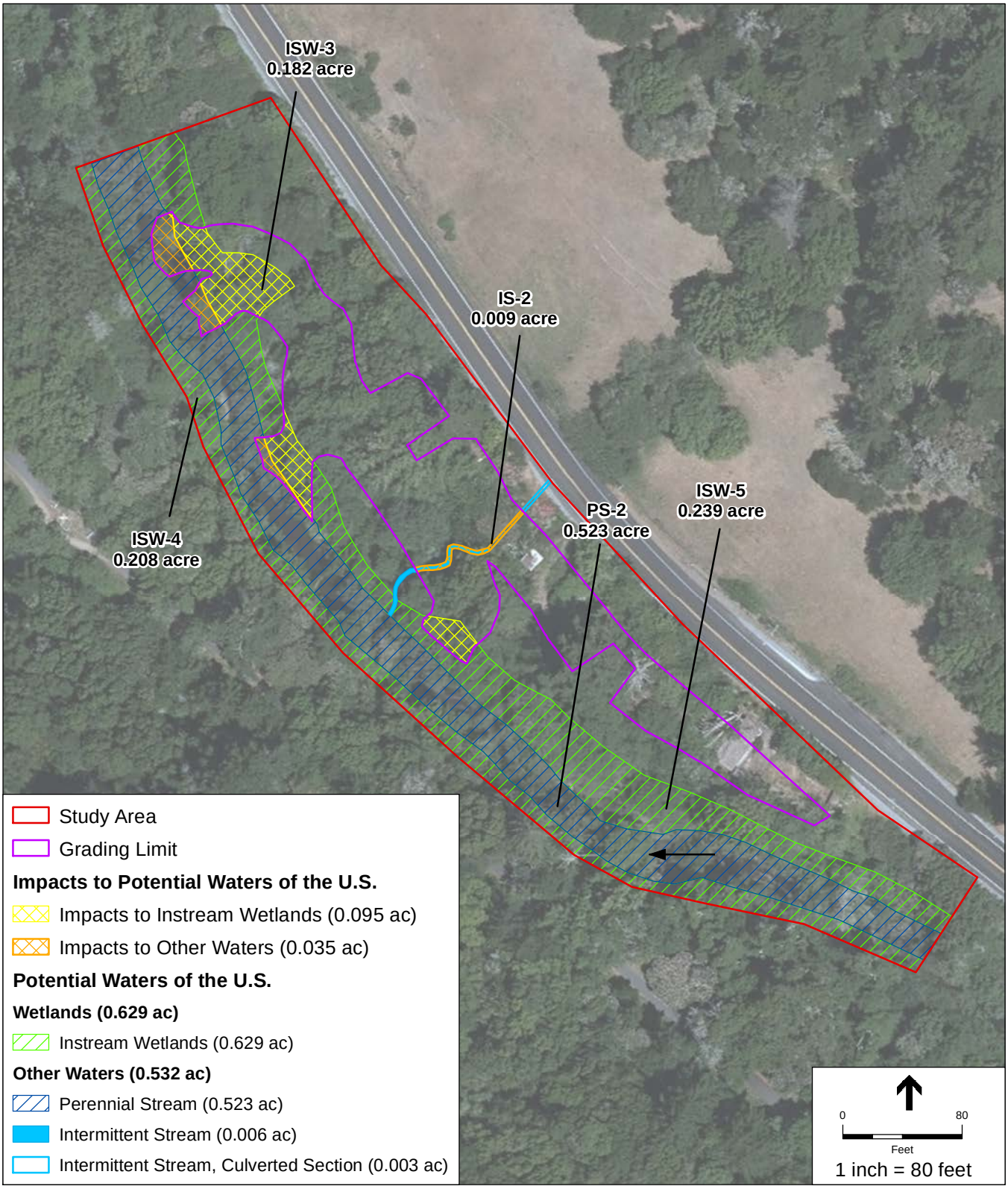


SOURCE: aerial (ESRI 2017), study area and potential waters (ESA 2017)

Lagunitas Creek Floodplain and Riparian Enhancement Project . 150145

Figure 3.1-3

Impacts to Potential Wetlands and Waters of the U.S. Site 1 and 3



SOURCE: aerial (ESRI 2017), study area and potential waters (ESA 2017)

Lagunitas Creek Floodplain and Riparian Enhancement Project . 150145

Figure 3.1-4

Impacts to Potential Wetlands and Waters of the U.S.
Site 2

3.1.4 Methodology

Due to the restorative nature of the proposed project, the following analysis focuses on impacts related to soils, natural hydrology, aquatic habitat features, surface water quality, and wetlands within Lagunitas Creek. The following primary aspects of water resources were assessed when considering potential impacts:

1. Natural processes including erosion, deposition, and maintenance of natural channel patterns
2. Water quality conditions necessary to support aquatic life within the creek systems

Direct impacts to wetland and water resources in and surrounding the study area would result from construction activities within and near wetlands and other waters (e.g. ground disturbing activities and clearing vegetation along the reconnected floodplain channels) and the potential changes in frequency of inundation of the existing channel and floodplain within the project area of Lagunitas Creek. Direct changes in the frequency and duration of inundation of the floodplain and the volume of flow would be expected to indirectly result in changes in the wetlands and other waters present within the study area. Both direct effects related to disturbance for construction and indirect effects related to altered hydraulic conditions are addressed below.

3.1.5 Impact Analysis Alternative A: Action Alternative

Beneficial Effects

The proposed project would result in long-term beneficial effects on hydrological processes, water quality, and wetland habitat in Lagunitas Creek.

Hydrological Processes

Approximately 1.2 acres of formerly developed areas would be disturbed to restore channel and floodplain hydrologic functions at three sites along Lagunitas Creek by removing fill and structure remnants built in the riparian corridor, restoring floodplain and riparian habitat, and protecting stream banks below Sir Francis Drake Boulevard from erosion. The primary construction methods to restore hydrologic functions would be fill excavation and removal, site grading, and installation of large wood habitat enhancement structures. Specifically, restoration actions would include removal of approximately 13,505 cubic yards (cy) of artificial fill (approximately 10,227 cy at Site 1 and 3,238 cy at Site 2 of concrete rubble and imported soil material) and regrading to establish and support hydraulic complexity and enhanced seasonal flow connectivity between the main creek channel and the floodplain, including creation of a secondary channel and backwater alcove. To support passive wood-loading and woody debris recruitment in the creek channel, large wood structures would be installed at specific locations. These in-channel enhancements would force flow into the secondary channel and backwater alcove features and during high flow events, spread flows into the restored floodplain thereby moderately reducing flood flow elevations. At Site 1, an existing culvert outfall drainage path from Sir Frances Drake Boulevard to Lagunitas Creek would be enhanced to improve runoff from Sir Frances Drake Boulevard. Proposed floodplain enhancements would result in long-term beneficial effects on hydrological processes.

Water Quality

The proposed project was designed to improve water quality in Lagunitas Creek by increasing deposition and retention of sediment on the floodplain to achieve the Lagunitas Creek TMDL goals and objectives. Sediment deposition and retention functions at the three project sites will be promoted through eliminating sources of erosion at the formerly developed areas on Sites 1 and 2 and stabilizing the slope below Sir Frances Drake Boulevard, installing large wood structures to capture sediment, and creating secondary channels and alcoves that will encourage sediment deposition and retention by enhancing hydraulic complexity and floodplain functions. These site enhancements would result in reduced transport of fine and coarse sediment through the project area, and would therefore have a beneficial effect on water quality in Lagunitas Creek.

Wetland Habitat

Implementation of the proposed project would improve the quality of wetland habitat in the project area. Floodplain and channel restoration, in conjunction with the removal of concrete debris in the channel, would reestablish the natural flow and floodplain inundation regimes in this portion of the creek. Additionally, creek banks would be graded to conform to existing banks downstream and upstream, and replanted with riparian vegetation to recreate a continuous riparian corridor within the area. Implementation of the proposed project would increase the extent and quality of aquatic and riparian habitats in the project area and would locally reduce streamflow velocities and erosion. These actions would have beneficial indirect effects on aquatic species, including salmonids, CFS, and CRLF.

Adverse Effects

Because the project objectives are intended to reverse pre-existing conditions currently causing adverse effects and restore natural physical processes within each project site, adverse effects on soils and hydrology are primarily limited to the temporary construction impacts. Long-term adverse effects could occur should the project not function as intended or create undesirable, unanticipated conditions (see further discussion below).

Flood Hazards

Watershed-wide conditions, including dam regulation upstream of the project reach, currently dictate the volume and frequency of peak flows (KHE, 2013). The proposed action would not change peak flow volumes, but it would result in site-specific effects on water surface elevations, flow rates, and flow paths in the immediate vicinity of each large wood habitat enhancement structure installed at Sites 1 and 2. A local lowering of the flood flow or a local raising of the flood flow immediately in front of or upstream of large wood structures would occur. However, these flow changes would not be sufficient to adversely affect the built environment at restoration Sites 1 and 2, and there are no human-occupied structures at either site (large wood structures would not be installed at Site 3). Additionally, expansion of the floodplain as part of the proposed action would allow potential flood flows to expand across a wider area, thereby decreasing their velocity and magnitude and preventing adverse effects to adjacent areas, including Sir Frances Drake Boulevard.

Short-Term Effects Related to Project Construction

Project construction has the potential to result in short-term adverse effects on water quality due to ground disturbing activities. Mechanized equipment, such as excavators would be located outside the channel on access roads, staging areas, benches, or adjacent property to minimize disturbance to the existing channel. Staging areas would be located in flat areas around the project site. While a minimal amount of clearing and grading would be required for creation of such staging areas, there is potential for some excess soils to be generated, and become exposed to the effects of wind and water causing sedimentation into the project reach.

These potential effects would be minimized by implementation of water quality protection measures prescribed by compliance with the *NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities* (SWRCB, 2009). Construction activities disturbing one acre or more of land, or that disturb less than one acre but are part of a larger common plan of development of one or more acres, are subject to the permitting requirements of the Construction General Permit (CGP). This permit requires that storm water discharges and authorized non-storm water discharges must not contain pollutants that cause or contribute to an exceedance of any applicable water quality objective or water quality standards. The CGP requires the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP), which must be submitted to the SWRCB along with the permit notification (a Notice of Intent) before construction begins. The SWPPP provides specific construction-related BMPs to prevent soil erosion and loss of topsoil. BMPs implemented may include, but would not be limited to: physical barriers to prevent erosion and sedimentation, construction of sedimentation basins, limitations on work periods during storm events, use of swales, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. Post-construction requirements require that construction sites match pre-project hydrology to ensure that the physical and biological integrity of aquatic ecosystems are sustained in their existing condition. The post-construction standards include structural and nonstructural control measures to ensure that all disturbed areas are stabilized, and to reduce pollutants in storm water discharges.

Disturbances due to installation of the project would be of limited duration, would be limited to the areas necessary to complete the work, and would occur during the dry season, and disturbed areas would be restored when construction activities are complete. Environmentally sensitive areas would be marked and protected from disturbance by construction equipment. The SWPPP would be implemented as needed to minimize the short-term and long-term effects of construction disturbances. Residual adverse effects remaining after implementation of erosion controls and other protective measures prescribed in the SWPPP, if any, would be short-term and would cease upon completion of project construction and revegetation activities.

Short-Term Effects Related to Flow Exclusion Areas

Exclusion areas to direct creek flows out of the work area would be required to complete installation of large wood structures. These flow exclusions could have temporary adverse effects on hydrological processes and water quality. However, only discrete areas along the channel would be affected at Sites 1 and 2 and neither diversion nor bypass of the entire creek would

occur. Gravity-fed diversion systems, including installation of sand bags bordering the flow exclusion area, would be utilized where possible and electric pumps (equipped with gravity flow intake) may be needed for flow exclusion areas as described in Chapter 2.

Given that the creek is impaired under CWA Section 303(d) for turbidity, instream construction must avoid sediment mobilization and corresponding increases in turbidity to the maximum extent practicable. Mitigation Measure **MM HYD-1** would ensure that instream construction proceeds with all the precautionary measures necessary to reduce adverse effects on water quality. MM HYD-1 requires development and implementation of a flow exclusion plan and impact avoidance and minimization measures for all sites that require flow exclusion during instream construction. In addition, Director's Order 77-1 BMPs, which would be implemented for the project (see Appendix A) would require water quality protection and certification.

Wetlands and Water Resources

The Action Alternative would temporarily impact 0.472 acres of instream wetlands and 0.081 acres of other water of the U.S. as a result of grading for floodplain restoration (see Figures 3.1-3 and 3.1-4). The intensity of these impacts within the small geographic area is considered limited. The impacts to instream wetlands and other waters are due to the creation of side channels and reconnection of Lagunitas Creek to a new floodplain. Although the proposed impacts would temporarily impact wetland habitat within the proposed new floodplain, the total area of wetland habitat would remain roughly equivalent or increase due to the new, more frequently inundated side channels and floodplain. To the extent feasible, native vegetation will be salvaged within the impacted areas prior to grading and replanted within the project area after grading is completed. The majority of the wetland vegetation that would be displaced would regenerate within a few growing seasons. The net effect would therefore be neutral or a net benefit in terms of total area of wetland habitat, and the temporary reduction in wetland habitat within the project area would therefore constitute a short-term adverse effect.

Indirect adverse effects on wetlands and water could include impacts to water quality during construction. However, these water-quality-related indirect effects to wetlands and waters would be minimized by implementation of the SWPPP as required by the GCP. Spill kits would be positioned with each operator of heavy equipment. Indirect effects related to construction of the proposed project could include creating a favorable environment for invasive non-native wetland plant species that are highly competitive in disturbed environments. Impacts to wetland vegetation would be minimized by implementation of Mitigation Measures **MM VEG-1** (general native vegetation protection) and **MM VEG-2** (habitat restoration and monitoring plan), described in Chapter 3.3, Vegetation.

Cumulative Effects

There are a number of existing management plans and programs that identify projects to address watershed resource issues in the Lagunitas Creek watershed, particularly related to enhancing water quality and aquatic and fisheries resources. For current and future projects, the cumulative analysis assumes the geographic area of analysis to be the Lagunitas Creek watershed, and identifies projects and actions currently taking place or that are anticipated to take place in this region. Specific

projects are identified in Chapter 2, *Alternatives* Table 2-4, including at least three other habitat enhancement projects. These cumulative projects are located sufficiently distant from the project sites such that cumulative impacts, including loss of topsoil and erosion resulting from compounded access of construction vehicles and equipment on Sir Francis Drake to staging areas, is unlikely to combine to become cumulatively considerable. In addition, the mitigation measures proposed for this project in combination with similar (primarily construction) mitigation measures included in other projects would avoid cumulative adverse impacts.

Cumulative effects to wetlands and waters would result if projects in proximity to the proposed project were implemented concurrently or in close succession such that the limited impacts of the projects, when considered in isolation, compound to result in a more significant impact by magnifying the geographic context, intensity, or duration of a particular effect. The proposed project could occur within the same time frame as a number of other restoration projects or small culvert or bridge replacement projects in the region as described in Chapter 2, *Alternatives*, Table 2-4. However, because the proposed project is not directly adjacent to these other projects and because the project's potential effects related to disturbance, like those of other projects, would be addressed through replanting, the proposed project would not contribute considerably to any potential cumulative effects.

Conclusion

Over the long-term, the proposed project's effects on hydrological processes and water quality would be site-specific and provide many beneficial effects. The potential for adverse effects is primarily limited to the construction period, during which staging, access, and in-stream construction methods could adversely impact existing conditions such as water quality, topsoil loss, and bank stability. Mitigation Measure **MM HYD-1** and compliance with the CGP, would reduce the adverse effects on both a short-term and long-term scale. Cumulatively, the project would not occur close enough in proximity or time frame to the construction of other projects in the region to have any cumulative adverse effects. Most other nearby projects have the same goals and objectives of improving water quality and wildlife habitat in Lagunitas Creek.

The project's effects on wetland resources are primarily localized and beneficial in the long-term, because it implements strategies to control long-term channel incision and to restore natural hydrology and species habitat including wetlands. The potential for adverse effects to wetland resources is primarily limited to short-term effects during and immediately following construction/installation activities in the local area and immediately downstream. Implementation of **MM HYD-1, MM VEG-1** and **MM VEG-2** address and minimize short-term construction-related effects and long-term effects to wetland vegetation within the study area. On a cumulative scale, the project is one of several actions being implemented throughout the watershed to improve water quality and wildlife habitat within Lagunitas Creek.

3.1.6 Alternative B: No Action Alternative

Beneficial Effects

Without the proposed project, the beneficial effects that could occur are the avoided adverse effects associated with construction of the Action Alternative. Construction-related disturbances including vehicle and equipment access, staging, and instream construction would not be necessary and implementation of Mitigation Measure HYD-1 and compliance with the CGP would not be necessary.

Adverse Effects

The following beneficial effects of the Action alternative would not occur. The pre-existing conditions can be considered adverse effects under the no-action alternative:

1. There would be no restoration of natural processes that could locally halt or reverse the adverse effects that channel incision has had on the Lagunitas Creek corridor. Incision on these sites would continue to occur.
2. During winter conditions, average velocities would not be reduced because the channel would not more distributed or connected to an expanded floodplain, but would instead continue to remain entrenched. Current high velocities during winter conditions would continue at Sites 1 and 2.
3. Without floodplain expansion and installation of large wood structures, the increased flow of water, during winter flows especially, along multiple paths would not increase, and the complexity of the creek channel would remain minimal. Additional areas for sediment to be sorted, metered, and stored would not be created.
4. Undesirable effects of in-stream sedimentation would continue to occur.

Cumulative Effects

Under the No Action alternative, no project action would combine with any other project listed in Table 2-4 to create a cumulatively beneficial or adverse effect. Therefore, no cumulative impacts would occur.

Conclusion

Under the no-action alternative, pre-existing conditions would continue. Anthropogenically-influenced physical processes would continue, and natural conditions optimal for Coho Salmon would not be restored.

In addition, because no direct action would occur as a result of the project, wetlands and waters of the U.S. would not be disturbed. Adverse effects to wetlands and waters related to construction of the proposed project would not occur under this project. Indirect effects related to construction of the proposed project could include creating a favorable environment for invasive nonnative wetland plant species that are highly competitive in disturbed environments would also not occur under the No Action Alternative. The No Action Alternative would have no impact in

combination with cumulative impacts in the project area. However, the potential benefit of floodplain being restored and creating more wetlands would also not occur.

3.1.7 Mitigation Measures

MM HYD-1 **Clear-Water Creek Diversions and Construction Flow Diversion.** The flow diversion area will encompass the minimum area necessary to perform the restoration activity. The period of flow diversion shall extend for the minimum amount of time needed to perform that maintenance activity. Where feasible and appropriate, diversions shall occur via gravity driven systems. Pumped water shall be discharged in conformance with all applicable laws and permit requirements and the channel and banks shall be returned to pre-project condition in those areas affected by diversion structures/activities.

A qualified biologist will be present to ensure that state or federally listed fish and other aquatic vertebrates are not stranded during construction and implementation of channel diversion. Prior to flow diversions, the affected area will be surveyed by a qualified biologist, and if necessary, relocation procedures will be implemented to ensure that state and federally listed fish and other aquatic invertebrates are not adversely affected (outlined in MM BIO-2 and MM BIO-5).

SPAWN shall prepare a Flow Diversion Plan to be approved by the NPS, RWQCB, USFWS, NMFS, and CDFW prior to beginning work. The flow diversion plan shall review all clear-water creek diversions and construction diversion considerations and best management practices described in the Basis of Design Report completed by ESA (2016) and/or any more recent design report completed to date. Examples of required BMPs include the following:

a. Sediment disturbance shall be minimized to the extent feasible during removal of in-water debris or excavation in conjunction with creek restoration.

b. Silt curtains shall be deployed around work activities that may generated significant turbidity.

c. Where flow diversion pumps are required (clear-water gravity diversion shall be the preferred method), intakes shall be screened with less than 5-millimeter mesh screen to prevent other aquatic organisms from entering the pump. In addition, a filtration/settling system shall be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system shall be based on the actual rate of discharge at time of construction.

d. Super sacks (gravel-filled sacks) installed around the flow exclusion area (not to be installed across the entire creek channel) shall be constructed of sandbags or gravel bags secured with polyethylene plastic sheeting; water-filled bladders; interlocking sheet piling; and/or other material. Gravel bags shall be filled with clean river run gravels. Super sacks shall be covered with visqueen to minimize water infiltration. During construction, inspection shall occur daily during the work week. Any gaps, holes, or scour shall be immediately repaired.

e. Water pumped from excavation areas shall not be discharged directly to surface waters without being treated to remove sediments generated during the flow diversion activities.

f. Water outfalls shall be contained within folded and secured filter fabric sediment traps to minimize turbidity to outfall areas.

g. When work is completed, the flow diversion structure shall be removed as soon as possible but no more than 48 hours after work is completed. Impounded water shall be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. Super sacks shall be removed such that surface elevations of water impounded by the super sacks are lowered at a rate greater than one inch per hour.

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3.2 Special Status Species

3.2.1 Introduction

The section of Lagunitas Creek within the footprint of the proposed project is home to multiple special status species and their federally designated critical habitat, all of which are discussed within this section. For the purposes of this EA/IS, the term special status species include those designated as:

1. Species listed, proposed for listing, or candidates for listing under State or Federal Endangered Species Acts;
2. State species of special concern;
3. State rare, endangered, or watch list species;
4. State native plants, as designated and ranked by the California Native Plant Society (CNPS).

The purpose of the proposed project is to improve the riparian ecosystem function and instream habitat for Coho Salmon (*Oncorhynchus kisutch*) within Lagunitas Creek. The project area consists of three sites along an approximately 2,000-foot stretch of Lagunitas Creek, including both the Lagunitas stream channel, riparian corridor and the surrounding floodplain habitat.

3.2.2 Regulatory Framework

Federal Endangered Species Act

The Federal Endangered Species Act (FESA), which is administered by the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS), protects fish and wildlife species identified by these agencies as threatened or endangered, as well as the habitats of identified species. In general, NMFS is responsible for the protection of FESA-listed marine species and anadromous fishes, whereas the USFWS has jurisdiction over FESA-listed wildlife, plant, and freshwater fish species. Several key definitions under FESA are described below.

1. ***Endangered*** refers to species, subspecies, or distinct population segments that are in danger of extinction throughout all or a significant portion of their range.
2. ***Threatened*** refers to species, subspecies, or distinct population segments that are likely to become endangered in the near future.
3. ***Take***[1] of listed species can be authorized through either the Section 7 consultation process for actions undertaken by federal agencies, or through the Section 10 permit process for actions undertaken by non-federal agencies where a Section 404 permit or other federal approval is not required.

[1] FESA defines *take* as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."

Magnuson-Stevens Fisheries Conservation Act

In response to growing concern about the status of U.S. fisheries, the Sustainable Fisheries Act of 1996 (Public Law 104-297) was passed by Congress to amend the Magnuson-Stevens Fishery Conservation and Management Act (Public Law 94-265), the primary law governing marine fisheries management in the federal waters of the United States. Under the Sustainable Fisheries Act, consultation is required by NMFS on any activity that might adversely affect designated Essential Fish Habitat (EFH). EFH includes those habitats that fish rely on throughout their life cycles. It encompasses habitats necessary to allow sufficient production of commercially valuable aquatic species to support a long-term sustainable fishery and contribute to a healthy ecosystem.

Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) (16 USC 703) authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 10, 12). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. Examples of permitted actions that do not violate the MBTA are the possession of a hunting license to pursue specific gamebirds, legitimate research activities, display in zoological gardens, bird-banding, and other similar activities. The USFWS is responsible for overseeing compliance with the MBTA, and the U.S. Department of Agriculture's Animal Damage Control Officer makes recommendations on related animal protection issues.

California Endangered Species Act

California Fish and Game Code (Section 2050 et seq.) prohibits the taking of species listed as threatened or endangered under CESA, or candidates for listing, except as authorized by state law. Section 2081 of CESA states that take of an endangered, threatened, or candidate species may be authorized by CDFW if the impacts of the take are incidental to an otherwise lawful activity, are "minimized and fully mitigated," and do not "jeopardize the continued existence of [the] species." Any mitigation measures imposed under CESA must be measures "roughly proportional in extent to the impact of the authorized taking on the species." An incidental take permit may be required for the proposed project.

3.2.3 Affected Environment

The portion of Lagunitas Creek impacted by the proposed project is home to a variety of special status plant and animal species. Information on the likelihood of occurrence for special status species within the project area was determined from an initial California Natural Diversity Database (CNDDB) search and then refined based on best-available scientific literature, see **Appendix E**.

The initial 9-quad CNDDB search returned 73 plant species, 54 special status wildlife species, and 5 sensitive natural communities that could potentially occur within the project area. Upon

further refinement, including a review of existing habitat features within the project area and, when available local species occurrence information, it was determined that 26 plant species and 17 special status wildlife species had potential to occur within the project area or immediate vicinity. These species and their relative likelihood of occurrence are shown in **Table 3.2-1** and shown on **Figure 3.2-1**.

Though many special status species have the potential to occur within the project area, only two species' designated Critical Habitat (CH)[2] falls within this section of Lagunitas Creek; central California coast (CCC) Coho Salmon and marbled murrelet. In addition, Lagunitas Creek is designated as Essential Fish Habitat (EFH), as determined by the Pacific Coast Salmon Fisheries Management Plan (FMP), which is covered under the Magnuson-Stevens Fishery Conservation and Management Act. Within the project area, the Pacific Coast Salmon FMP includes protections for California Coastal Chinook Salmon and CCC Coho Salmon.

Listed Species with Potential to Occur

Native Plants

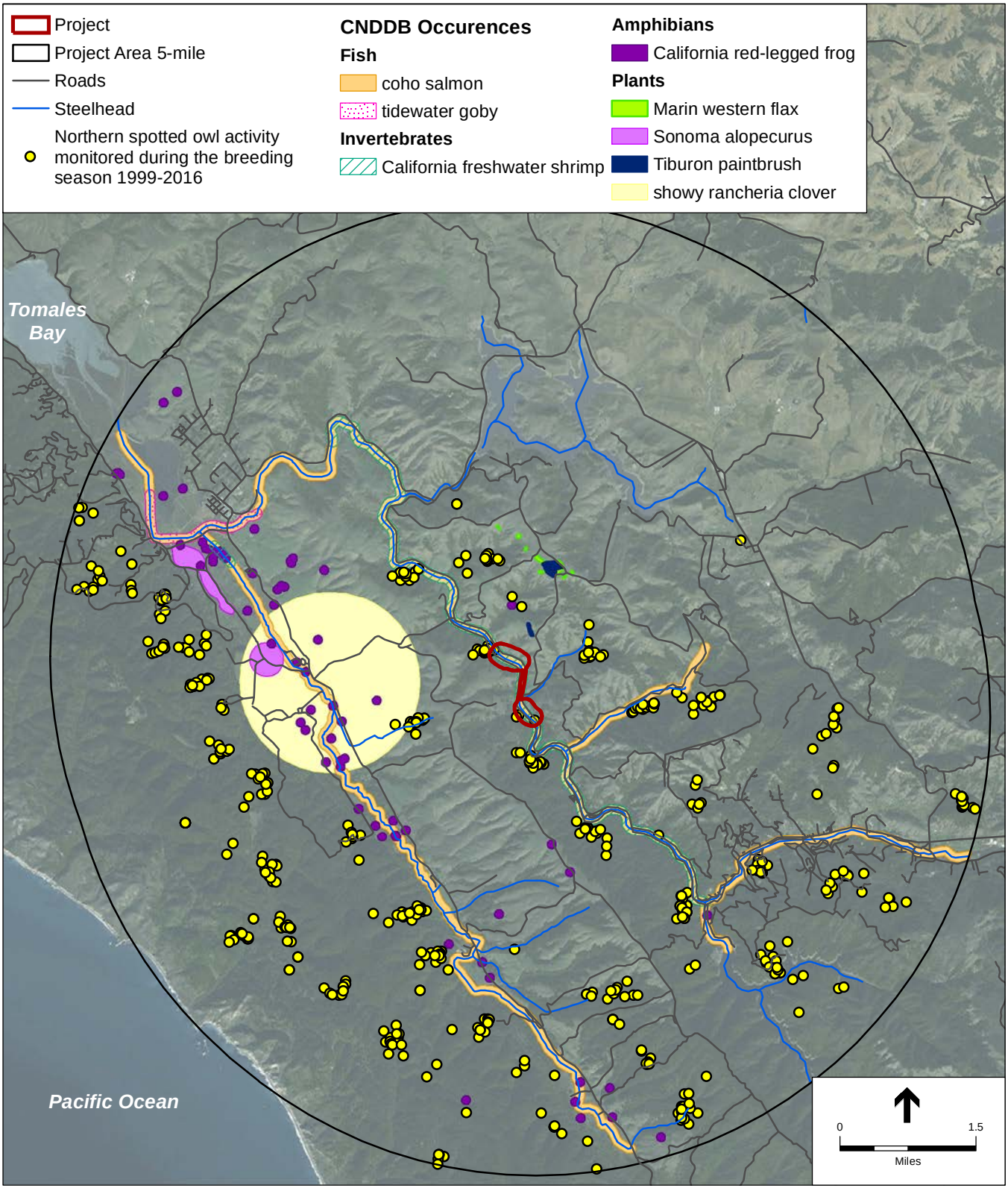
Several special status plant species have the potential to occur within the project area and in the immediate vicinity (Table 3.2-1). Many of these species have specific habitat requirements that significantly reduce their likelihood of occurrence within the project area (e.g., serpentine soils, grassland habitat, rocky outcrops, etc.). Of the species with potential to occur within the project area, California bottle brush grass (*Elymus californicus*) has high potential to occur and three species have moderate potential to occur: bent-flowered fiddleneck (*Amsinckia lunaris*), western leatherwood (*Dirca occidentalis*), and congested-headed hayfield tarplant (*Hemizonia congesta* ssp. *congesta*).

Invertebrates

California Freshwater Shrimp (*Syncaris pacifica*)

California freshwater shrimp was listed as endangered in 1988 (53 FR 43884). No critical habitat has been designated for this species. California freshwater shrimp are found in low elevation (generally less than 380 feet [116 meters]), low gradient (generally less than 1 percent), freshwater, perennial streams in isolated locations within Marin, Napa, and Sonoma Counties, California. Freshwater shrimp utilize pools and glides in low-gradient streams that have moderately undercut banks, sandy substrate, and exposed roots from bankside vegetation. During the winter, habitat includes shallow margins of stream pools containing undercut banks and exposed living fine-root material that provide shelter and refuge from high water velocities associated with winter storm events. During the summer months, California freshwater shrimp are often associated with submerged leafy branches. It is believed both winter and summer habitat components need to be found in close proximity for this species to persist for prolonged periods. (USFWS, 1998 and 2011).

[2] Defined under the Federal Endangered Species Act (FESA) as geographic areas that contain features essential to the conservation of an endangered or threatened species and that may require special management and protection.



SOURCE: aerial (ESRI), creeks (NHD), action area (ESA 2017), steelhead (CDFW 2005), Northern spotted owl (NPS 2016), CNDDB (CDFW 2017)

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Figure 3.2-1

Occurrences of Federally-Listed Species within 5 miles of the Action Area

TABLE 3.2-1
SPECIAL STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status[1] (Federal/State)	Habitat	Potential to Occur
Plants				
White-rayed pentachaeta	*Pentachaeta bellidiflora*	FE/SE	Serpentine soils within grassland and chaparral. Elevations 0-215 ft. Blooms March-May.	Low. Some grassland and scrub vegetation is present, but within a disturbed area near existing buildings. No serpentine soils are documented within the project area.
Baker's larkspur	*Delphinium bakeri*	FE/SE	Grassland, coastal scrub, and upland forest. Elevations 65-920 ft. Blooms April-June.	Low. Only one extant occurrence along Salmon Creek in Sonoma County. Disturbed areas contain some grassland and coastal scrub species, but do not provide quality habitat.
Tiburon paintbrush	*Castilleja affinis* var. *neglecta*	FE/ST	Valley and foothill grasslands, in serpentine soils. Elevation 130 to 1410 feet. Blooms April – June.	Low. Some grassland vegetation is present, but within a disturbed area near existing buildings. No serpentine soils are documented within the project area.
Marin western flax	*Hesperolinon congestum*	FT/ST	Grassland and chaparral habitat, in serpentine soils. Elevation 13 to 1380 feet. Blooms April - July.	Low. Some grassland and chaparral vegetation is present, but within a disturbed area near existing buildings. No serpentine soils are documented within the project area.
Two-fork clover	*Trifolium amoenum*	FE/1B.1	Open flats and low hills in clay soils. Elevation 15 to 1350 ft. Blooms April - June.	Low. Project area lacks suitable habitat.
North Coast semaphore grass	*Pleuropogon hooverianus*	-/ST	Margins of redwood forest, in grassland habitat. Elevation 195 to 1870 feet. Blooms April-June.	Low. Project area lacks suitable habitat.
Napa false indigo	*Amorpha californica* var. *napensis*	-/1B.2	Broadleaf upland forest, chaparral, and cismontane woodland. Elevation 100 to 1935 feet. Blooms April – July.	Low. Project area lacks suitable habitat.
Bent-flowered fiddleneck	*Amsinckia lunaris*	-/1B.2	Grassland and woodland, often in serpentine soils. Elevation 100 - 2230 feet. Blooms March-June.	Moderate. Marginal habitat present within the project area.
Mt. Tamalpais manzanita	*Arctostaphylos montana ssp. montana*	-/1B.3	Serpentine soils within chaparral and grassland slopes. Elevation 690 to 3575 feet. Blooms February – April.	Low. Project area lacks suitable habitat.

TABLE 3.2-1 (CONTINUED)
SPECIAL STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status[1] (Federal/State)	Habitat	Potential to Occur
Plants (cont.)				
Marin manzanita	*Arctostaphylos virgata*	-/1B.2	Primarily on sandstone and granite outcrops within broadleaf forest and chaparral. Elevation 45 to 2295 feet. Blooms January – March.	Low. Project area lacks suitable habitat.
Mt. Tamalpais thistle	*Cirsium hydrophilum* var. *vaseyi*	-/1B.2	Serpentine seeps, broadleafed upland forest, chaparral, and meadows. Elevation 625 to 2035 feet. Blooms May – August.	Low. Project area lacks suitable habitat.
Western leatherwood	*Dirca occidentalis*	-/1B.2	Partially shaded, moist soils on hillsides. Elevation 40 to 1835 feet. Blooms January – March.	Moderate. Suitable habitat is present.
California bottle brush grass	*Elymus californicus*	-/4.3	Broadleafed upland forest, cismontane woodland, riparian woodland, and North Coast coniferous forest. Elevation 50 to 1550 feet. Blooms May – August.	High. Suitable habitat is present. One historic observation in 1969 is less than a mile from Sites 1 and 2. Three observations were documented in 2011 and 2016 upstream of Site 2 within Samuel P. Taylor State Park. Other recent and historic observations have been documented throughout the surrounding area.
Koch's cord moss	*Entosthodon kochii*	-/1B.3	Moss, found near river banks on serpentine soils. Elevation 590 to 3280 feet.	Low. River bank habitat is present, but serpentine soils are not.
Tiburon buckwheat	*Eriogonum luteolum* var. *caninum*	-/1B.2	Sandy, serpentine soils within chaparral, grassland, and cismontane woodlands. Elevation 65 to 2065 feet. Blooms May – September.	Low. Project area lacks suitable habitat.
Marin checker lily	*Fritillaria lanceolata* var. *tristulis*	-/1B.1	Exposed rocky slopes along the coast. Elevation 50 to 490 feet. Blooms February- May.	Low. Project area lacks suitable habitat.
Fragrant fritillary	*Fritillaria liliacea*	-/1B.2	Grassy hills near the coast. Elevation 20 to 1215 feet. Blooms February - April.	Low. Project area lack suitable habitat.
Woolly-headed gilia	*Gilia capitata* ssp. *tomentosa*	-/1B.1	Often in serpentine soils within coastal scrub and grassland. Elevation 30 to 690 feet. Blooms May-July.	Low. Project area lacks suitable habitat.

TABLE 3.2-1 (CONTINUED)
SPECIAL STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status[1] (Federal/State)	Habitat	Potential to Occur
Plants (cont.)				
Congested-headed hayfield tarplant	*Hemizonia congesta* ssp. *congesta*	-/1B.2	Valley grasslands and sometimes roadsides. Elevation 100 to 3480 feet. Blooms April-November.	Moderate. Species can occur in disturbed areas and therefore the project areas contain suitable habitat.
Tamalpais lessingia	*Lessingia micradenia* var. *micradenia*	-/1B.2	Serpentine soils within grassland and chaparral. Elevation 820 to 1280 feet. Blooms July-October.	Low. Project area lacks suitable habitat.
Marsh microseris	*Microseris paludosa*	-/1B.2	Cismontane woodland, grassland and coastal scrub. Elevation 45 to 1935 feet. Blooms April-June.	Low. Project area lacks suitable habitat.
Marin County navarretia	*Navarretia rosulata*	-/1B.2	Dry, open, rocky sites in chaparral and coniferous forest; rarely in serpentine soils. Elevation 1115 to 2200 feet. Blooms May-July.	Low. Project area lacks suitable habitat.
Tamalpais oak	*Quercus parvula* var. *tamalpaisensis*	-/1B.3	Understory of lower montane coniferous forests. Elevation 655 to 2265 feet. Blooms March-April.	Low. Project area lacks suitable habitat.
Tamalpais jewelflower	*Streptanthus batrachopus*	-/1B.3	Serpentine outcrops within chaparral and coniferous forest. Elevation 1245 to 2165 feet. Blooms April – July.	Low. Project area lacks suitable habitat.
Mt. Tamalpais bristly jewelflower	*Streptanthus glandulosus* ssp. *pulchellus*	-/1B.2	Shale and sandstone on exposed ridges, and serpentine soils. Elevation 395 to 2100 feet. Blooms May – July.	Low. Project area lacks suitable habitat.
Coastal triquetrella	*Triquetrella californica*	-/1B.2	Moss, found in grassland and dense chaparral, on exposed shaded rock, sand, or gravel soils. Elevation 32 to 330 feet.	Low. Project area lacks suitable habitat.
Seaside bittercress	*Cardamine angulata*	-/2B.1	Shady thickets, streambanks, forest, and loam soil. Elevation 80 to 3000 feet. Blooms April – June.	Low. Habitat present, however there is only one occurrence in the San Geronimo area documented in 1915. No other occurrences occur within the Bay Area.
Invertebrates				
California freshwater shrimp	*Syncaris pacifica*	FE/SE	Endemic to Marin, Napa and Sonoma counties. Found in low elevation, low gradient, low velocity streams with riparian cover.	Present. This species occurs in Lagunitas Creek in the Tocaloma reach close to the project area.

TABLE 3.2-1 (CONTINUED)
SPECIAL STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status[1] (Federal/State)	Habitat	Potential to Occur
Invertebrates (cont.)				
San Bruno elfin butterfly	*Callophrys mossii bayensis*	FE/-	Inhabits rocky outcrops and cliffs in **coastal** scrub.	Low. Project area lacks suitable habitat for this species.
Amphibians				
California red-legged frog	*Rana draytonii*	FT/SSC	Occurs in a broad range of freshwater and nearby upland habitats. Primarily in the lowland and foothill stream habitats with dense riparian vegetation.	High. This species occurs in the Lagunitas creek watershed. The project area provides non-breeding aquatic and riparian habitat.
Foothill yellow-legged frog	*Rana boylii*	-/SSC	Frequents rocky streams and rivers with rocky substrate and open, sunny banks, in forests, chaparral, and woodlands. Sometimes found in isolated pools, vegetated backwaters, and deep, shaded, spring-fed pools.	Low. Project area contains suitable perennial stream habitat but lacks rocky substrate. Small, isolated populations present on Mt. Tamalpais but no observations in Lagunitas Creek.
Reptiles				
Western pond turtle	*Emys marmorata*	-/SSC	Requires aquatic habitat with suitable access to basking sites and upland habitats.	High. Lack of nesting habitat, but suitable aquatic habitat is present in project area.
Fish				
Coho Salmon - central California coast ESU	*Oncorhynchus kisutch*	FE/SE	Anadromous Pacific salmonid utilized Lagunitas Creek watershed for spawning; requires cold, clear, well-oxygenated streams with gravel substrates.	Present. Known to spawn and rear in Lagunitas Creek.
Steelhead - central California coast DPS	*Oncorhynchus mykiss*	FT/-	Anadromous Pacific salmonid utilized Lagunitas Creek watershed for spawning; requires cold, clear, well-oxygenated streams with gravel substrates.	Present. Known to spawn and rear in Lagunitas Creek.
California coastal Chinook Salmon ESU	*Oncorhynchus tshawytscha*	FT/-	Anadromous Pacific salmonid utilized Lagunitas Creek watershed for spawning; requires cold, clear, well-oxygenated streams with gravel substrates.	High. Has been observed in Lagunitas Creek.
Tomales roach	*Lavinia symmetricus ssp.*	-/SSC	Localized subspecies found only within freshwater tributaries to Tomales Bay.	High. Suitable habitat is present in Lagunitas Creek.

TABLE 3.2-1 (CONTINUED)
SPECIAL STATUS SPECIES WITH POTENTIAL TO OCCUR IN THE PROJECT AREA

Common Name	Scientific Name	Status[1] (Federal/State)	Habitat	Potential to Occur
Fish (cont.)				
Pacific lamprey	*Entosphenus tridentatus*	-/SSC	Anadromous species known to spawn in Lagunitas Creek; requires similar stream conditions to salmonids.	High. Known spawning habitat is present in Lagunitas Creek.
Birds				
Marbled murrelet	*Brachyramphus marmoratus*	FT/SE	Primarily found along the Pacific coast but nests in inland, forested habitats.	Low. Habitat present, but there are no reported nesting records in Marin County.
Northern spotted owl	*Strix occidentalis caurina*	FT/ST	Nests in mature forest habitat, including old growth and secondary forests.	High. Nesting recorded in Samuel P. Taylor State Park near project area and territories documented within 1,000 feet of the project area.
Mammals				
Pallid bat	*Antrozous pallidus*	-/SSC	Found throughout California primarily in open, dry habitat with rocky outcrops for roosting.	High. Observed in nearby Olema Creek, this species may forage or night roost in project area.
Point Reyes mountain beaver	*Aplodontia rufa phaea*	-/SSC	Most common in coastal and riverine habitat along overgrown, north-facing slopes.	Low. Marginal habitat present in riparian corridor in project area, but no occurrences nearby.
Townsend's big-eared bat	*Corynorhinus townsendii*	-/SSC	Occurs throughout California, most commonly in mesic habitats. Roost in caves, mines, tunnels, abandoned buildings or hollowed trees.	High. Suitable foraging habitat is present along creek, and this species has been observed in buildings near the project area.
American badger	*Taxidea taxus*	-/SSC	Most common in open prairie and grassland habitat. Occasionally, found in chaparral habitat.	Low. Suitable dry grassland habitat for burrowing is not found in the project area.

[1] Description of status codes: Not Present: Absent. Low: Unlikely to occur. Moderate: May occur. High: Likely to occur. Present: Present

Federal Listings:

FE = Listed as endangered under the FESA
FT = Listed as threatened under the FESA
FCS = Federal candidate species (USFWS)

State Listings:

SE = Listed as endangered under the CESA
ST= Listed as threatened under the CESA
SSC = Species of Special Concern (CDFW)
SFP = State Fully Protected (CDFW)
WL = Watch List (CDFW)

CRPR Element Rankings:

1A = Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B = Rare, Threatened, or Endangered in California and Elsewhere
2A = Presumed Extirpated in California, But Common Elsewhere
2B = Rare, Threatened, or Endangered in California, But More Common Elsewhere
3 = Plants about which more information is needed – a review list
4 = Plants of limited distribution – a watch list
0.1 = Seriously threatened (high degree of threat)
0.2 = Fairly threatened (moderate degree of threat)
0.3 = Not very threatened (low degree of threat)

SOURCE: CNDDB 2017, CNPS 2017, Calflora 2017

The shrimp are found along the edges of stream pools, in areas away from the main current; they tend to only occupy portions that are one to four feet deep at the channel edge and do not occupy gradually sloping channel edges (Serpa, 2013). During high-flow storm events, shrimp seek refuge by moving into the more protected areas provided by undercut banks and among the tree roots along the edges of pools.

Existing populations are threatened by introduced fish, deterioration or loss of habitat resulting from water diversion, impoundments, livestock and dairy activities, agricultural activities and developments, flood control activities, gravel mining, timber harvesting, migration barriers, and water pollution (USFWS, 1998).

Occurrence in the Project Area

Lagunitas Creek has one of the largest populations of California freshwater shrimp, and is the only California freshwater shrimp stream that runs through protected lands (Serpa, 2013). The largest gathering of California freshwater shrimp in Lagunitas Creek is in the Tocaloma reach (within the project area), which extends from Samuel P. Taylor State Park boundary (upstream limit of the project area) to the Platform Bridge (downstream of the project area). Official population monitoring studies began in 1991. The population numbered approximately 6,000 shrimp in 2013.

Monitoring reports suggest that the Devil's Gulch confluence is the upstream limit for California freshwater shrimp (Serpa, 2013). Habitat quality is highest in the Tocaloma reach (slightly downstream of the project area) and downstream to the Gallagher Bridge, with the Tocaloma reach having the highest abundance of California freshwater shrimp. Site 1 presently contains fair to poor/fair quality habitat for this species, while Site 2 contains poor quality habitat.

Amphibians

California Red-legged Frog (*Rana draytonii*)

The California red-legged frog was federally listed as threatened on May 23, 1996 (61 FR 25813). Critical habitat was designated March 17, 2010 (75 FR 12816). The project area is not within critical habitat for this species.

California red-legged frogs breed in deep pools, stock ponds, lakes or slow-moving streams with overhanging woody vegetation, often willows (*Salix* spp.), with a fringe of cattails (*Typha latifolia*) (Jennings and Hayes, 1994). During summer and fall months, this species may disperse upstream and downstream of breeding sites to forage and seek sheltering habitat (refugia). Such shelter may include all aquatic, riparian, and upland areas and any landscape features that provide cover, such as small mammal burrows, rocks piles, organic debris (e.g., downed trees or logs), leaf litter, or industrial debris. Incised stream channels with portions narrower than 18 inches and depths greater than 18 inches also may provide summer sheltering habitat. During winter rain events, juvenile and adult California red-legged frogs are known to disperse over 1 mile (1 to 2 km) (USFWS, 2002). California red-legged frogs generally breed from January to May, attaching eggs to vegetation, fencing, or other attachment sites in shallow water.

The California red-legged frog is threatened within its remaining range, by human impacts to its habitat, including urban encroachment, water diversions, contaminants, agriculture, and livestock grazing, which degrade, and fragment habitat. The introduction of non-native predators and competitors, especially American bullfrog (*Lithobates catesbeianus*) also threatens many California red-legged frog populations (USFWS, 2002).

Occurrence in the Project Area

California red-legged frog is found primarily in coastal drainages of central California, from southern Mendocino County south to northern Baja California, Mexico (USFWS, 2002). The project area occurs near the northern end of this species' range.

California red-legged frog has been observed within two miles of the project area, and the species has high potential to occur within the project area (CDFW, 2017) on an intermittent basis. However, California red-legged frogs are not likely to breed within Lagunitas Creek because of the creek's relatively incised banks, the seasonality of storm surges relative to the breeding frog's season, and cold, fast-moving waters. Slower-moving eddies and pools at the margins of Lagunitas Creek may provide suitable places for egg attachment; however, egg masses in these could be washed away during high flows. California red-legged frogs originating from nearby suitable breeding habitat in pools or stock ponds may use the project area for dispersal or foraging movements.

Birds

Northern Spotted Owl (*Strix occidentalis caurina*)

The northern spotted owl was listed as threatened under the Endangered Species Act on June 26, 1990 (55 FR 26114). Final critical habitat was published in December 2012 (77 FR 32483). The project area is not within critical habitat for this species.

Northern spotted owls live in forests of mature and old-growth trees characterized by dense canopy closure, abundant logs, standing snags, and live trees with broken tops. Populations appear to have declined annually since 1985. Northern spotted owls are currently declining range wide at an average rate of 2.9 percent each year; though the population in the Bay Area has remained more stable (USFWS, 2011).

The most important range-wide threats to the spotted owl are competition with barred owls, ongoing loss of spotted owl habitat as a result of timber harvest, habitat loss or degradation from stand-replacing wildfire and other disturbances, and loss of amount and distribution of spotted owl habitat as a result of past human activities and disturbances (USFWS, 2011).

Occurrence in the Project Area

Northern spotted owls have been observed within the project area (see Figure 3.2-1) and 11 northern spotted owl territories are documented within two miles of the project area (CDFW, 2017). The northern spotted owl could nest and roost in trees close to the project area, and has high potential for activity within the project area for foraging or dispersal from nearby territories.

Marbled Murrelet (*Brachyramphus marmoratus*)

The marbled murrelet was federally listed as endangered on September 28, 1992 (57 FR 45328). The project area is within critical habitat for this species. Marbled murrelets spend most of their lives in the near-shore marine environment, but use old-growth forests for nesting. Marbled murrelets are opportunistic feeders and utilize prey of diverse sizes and species, primarily fish and invertebrates in marine waters. In California, nests are typically found in coastal redwood and Douglas-fir forests with large trees, multiple canopy layers, and moderate to high canopy closure, located close to the marine environment. Marbled murrelets produce one egg per nest and usually only nest once a year. Fledglings fly directly from the nest to the ocean (USFWS 1997).

The amount of suitable habitat has continued to decline throughout the range of the marbled murrelet, primarily due to commercial timber harvest. Additional threats include predation, gill-net fishing operations, oil spills, marine pollution, and disease (USFWS, 1997).

The forest in Samuel P. Taylor state park is included in critical habitat (Unit CA-09-B) for the marbled murrelet. Because it is within range of marbled murrelet, it is considered occupied, though there are no known records of nesting murrelets in Marin County.

Occurrence in the Project Area

The upstream end of the project area overlaps with marbled murrelet critical habitat in Samuel P. Taylor State Park (CDFW, 2017). Marbled murrelet populations nest discontinuously in Santa Cruz and San Mateo Counties to the south of the project area, and in Mendocino County to the north. A few unverified inland sightings of marbled murrelets have been reported since 1990, but no surveys in Marin County have detected breeding marbled murrelets (Gardali and Geupel, 2000). Marbled murrelets are not likely to occur in the project area, except for isolated sightings of non-nesting birds.

Fish

Coho Salmon – Central California Coast ESU (*Oncorhynchus kisutch*)

Coho Salmon are anadromous fish, rearing at least partially in freshwater, migrating to the ocean as smolts, spending their adult lives in the ocean, and then migrating back into freshwater streams to spawn. Most Coho Salmon return to their natal streams to spawn in their third year, after which they die (Moyle, 2002). Within freshwater streams, Coho Salmon require adequate, year-round stream flows, cold water, streamside shade, instream and off-stream shelter and pools, and access to spawning gravels with a low fine sediment component. Spawning typically occurs at the tail of pools, or head of riffles, where substrate, depths, velocities, and streamside cover is adequate. Rearing habitat can widely vary, depending on flow levels and what is available. In channel rearing habitats can be associated with interstitial voids of gravels, cobbles and boulders as well as large woody material that either has fallen in the channel or is growing along the channel and is partially undercut. Off-channel rearing habitats include flooded brush, large trees, and flow refugia zones associated with rapid expansions or contractions in flow width. Summer and winter rearing survival for Coho Salmon is low due to impaired instream habitats, such as lack of habitat complexity formed by instream wood, high sediment loading, high instream temperatures, lack of refugia, and

low summer flows. These impairments are caused by roads, water diversion and impoundment, residential and commercial development and severe weather conditions (NMFS, 2012).

Occurrence within the Project Area

The Coho Salmon that occur within Lagunitas Creek belong to the Central California Coast Evolutionary Significant Unit (ESU) which was federally listed as threatened in 1996, and reclassified as endangered in 2005. Although the species is in decline throughout the ESU, the Lagunitas Creek population of Coho, including fish spawning in the tributary streams of Olema Creek, San Geronimo Creek, and Devil's Gulch is considered persistent and moderately abundant (NMFS, 2012). Coho Salmon are also known to occur in neighboring watersheds such as those of Redwood creek and occurrence in last 20 years in Pine Gulch, but are currently extirpated at these locations (NMFS, 2012). Adult Coho Salmon typically return to Lagunitas Creek from October to February depending on high flow events, with peak migrations in December and January. Juvenile smolts typically emigrate to the ocean from February to June, peaking from March to April (Fukushima and Lesh, 1998). Coho Salmon have the potential to occur year round within the project area; however, they are most likely to occur during spawning and migration events.

Chinook Salmon – California Coastal ESU (*Oncorhynchus tshawytscha*)

The Chinook Salmon is the largest and least abundant species of Pacific salmon, and, like all salmonids, Chinook are anadromous. Unlike steelhead, Chinook Salmon are semelparous (single spawners) and die after spawning. Chinook Salmon have very similar spawning requirements to those described above for Coho Salmon, requiring cool, swift, well-oxygenated stream habitat. However, Chinook use the largest substrate of any California salmonid for spawning, preferring a mixture of large gravel and small cobble. While rearing in stream habitats, Chinook Salmon feed on aquatic and terrestrial invertebrates, in intertidal habitats salmon feed on amphipods, insects, and fish larvae. During the oceanic life stage, during which most growth occurs, Chinook Salmon feed on fish, large crustaceans, and squid (Moyle, 2002).

Occurrence within the Project Area

During winter 2013-2014, 11 adult Chinook spawners were observed within Lagunitas Creek and 23 Chinook Salmon redds were observed during the following survey season (Ettlinger and Andrew, 2014). It appears that the Chinook Salmon population within Lagunitas Creek is derived from both hatchery origin fish as well as those from the California coastal ESU. Chinook Salmon are not likely to occur year round within the project area since they migrate out during their first year as smolts by early summer; however, they are most likely to occur during spawning and migration events.

Steelhead – Central California Coast DPS (*Oncorhynchus mykiss*)

Steelhead may be residents (non-migratory, often referred to as rainbow trout) or may migrate to the open ocean (anadromous). Steelhead are unique among Pacific salmon in that ocean-migrating individuals may return to the ocean after spawning and return to freshwater to spawn one or more times.

Eggs (laid in gravel nests called redds), alevins (gravel dwelling hatchlings), fry (juveniles newly emerged from stream gravels), and young juveniles all rear in freshwater until they become large enough to migrate to the ocean to finish rearing and maturing to adults. Status reviews of steelhead in California document much variation in life history (Shapovalov and Taft, 1954). Although variation occurs, in coastal California, steelhead usually live in freshwater for one to two years, then spend an additional one or three years in the ocean before returning to their natal stream to spawn.

During the adult migration season, the timing of upstream immigration typically correlates with seasonal high flows and associated lower water temperatures. The minimum stream depth necessary for successful upstream migration is about 5 inches (Bell, 1991). The preferred water velocity for upstream migration is in the range of 1 to 3 fs, with a maximum velocity, beyond which upstream migration is not likely to occur, of 8 fs (Bell, 1991). Most spawning takes place from January through April. Steelhead may spawn more than one season before dying (iteroparity), in contrast to other species of the genus *Oncorhynchus*. Most adult steelhead in a run are first time spawners.

Steelhead select spawning sites with gravel substrate and with sufficient flow velocity to maintain circulation through the gravel and provide a clean, well-oxygenated environment for incubating eggs. Preferred flow velocity is in the range of 1 to 3 fs for steelhead and preferred gravel substrate is in the range of 0.25 to 4 inches in diameter (Bjornn and Reiser, 1979). Typically, sites with preferred features for spawning occur most frequently in the pool tail/riffle head areas where flow accelerates out of the pool into the higher gradient section below. In such an area, the female will create a pit, or redd, by undulating her tail and body against the substrate.

Steelhead fry generally rear in edgewater habitats and move gradually into pools and riffles as they grow larger. Cover is an important habitat component for juvenile steelhead, both as a velocity refuge and as a means of avoiding predation. Steelhead, however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids. Young steelhead feed on a wide variety of aquatic and terrestrial insects, and emerging fry are sometimes preyed upon by older juveniles.

Temperature is also an important factor for steelhead/rainbow trout, particularly during the over-summer rearing period (Moyle 2002). The upper lethal temperature for Pacific salmonids is in the range 23.9 to 25°C for continuous long-term exposure. Some researchers indicate an upper lethal temperature for Pacific salmonids as low as 22.9°C; however, steelhead can survive for short periods at elevated temperatures, especially if abundant food and dissolved oxygen exist (Moyle, 2002).

Occurrence within the Project Area

Adult steelhead typically return to Lagunitas Creek from December to April depending on high flow events, with peak migrations in January and February. Juvenile smolts typically emigrate to the ocean from February to June, peaking from April to March (Fukushima and Lesh, 1998). During yearly salmonids surveys juvenile and adult steelhead are consistently recorded in Lagunitas Creek, within the vicinity of the project area (Ettlinger et al., 2014 and 2015). While steelhead have the potential to occur year round within the project area given appropriate hydrologic conditions, they are most likely to occur during spawning and migration events.

Other Special Status Species with Potential to Occur

Tomales Roach (*Lavinia symmetricus*)

California Species of Special Concern, Tomales roach (*Lavinia symmetricus* ssp.) are endemic to the small streams and larger tributaries of Tomales Bay. Roach can tolerate a wide range of habitat and water quality conditions depending on the streams in which they are acclimated. Roach are a smaller, stout-bodied cyprinid, with a narrow caudle peduncle and deeply forked tail with adult fish rarely achieve lengths greater than 100 mm total length (Moyle, 2002). Roach exhibit similar habitat preferences, temperature tolerances, and behavior to Sacramento hitch (*Lavinia exilicauda*) and other native cyprinids, often existing (and hybridizing) in the same lowland reaches of streams (Moyle, 2002). Roach are typically found in shallow pools of small-to-medium streams, with high water clarity, warm water temperatures, and sand-gravel dominated substrates under an open riparian canopy (Moyle, 2002).

Occurrence within the Project Area

Tomales roach are consistently recorded within the vicinity of the project area during yearly juvenile salmonid surveys within Lagunitas Creek (Ettlinger et al., 2014 and 2015). As such, they have a high potential to occur year round within the project area.

Western Pond Turtle (*Actinemys marmorata*)

Western pond turtles are aquatic, living in ponds, marshes, rivers, streams and irrigation ditches. They require sunny basking sites consisting of logs, vegetation mats, or rocks; and upland habitat for egg-laying. Females may travel up to 0.5-mile to the nesting site, while annual movements of 0.1-mile or more may occur to winter refuges above flood levels. Adults and young feed on insects, small fish, worms, crustaceans, carrion, and algae. Adults may hibernate or estivate to avoid extremes of heat or cold (Natureserve, 2017).

Occurrence within the Project Area

Western pond turtles are found in Marin Municipal Water District (MMWD) reservoirs, including Lake Lagunitas and Alpine Lake, and Nicasio Reservoir. There are documented occurrences of western pond turtle downstream of the project area in the Olema Creek area and within the Lagunitas Creek watershed (MMWD, 2017). Based on known occurrences and the lack of suitable habitat on Lagunitas Creek within the project area, the western pond turtle has a low potential to occur.

Pallid Bat (*Antrozous pallidus*)

This species occurs in deserts, grasslands, shrublands, woodlands, and forests. It is most common in open, dry habitats with rocky areas for roosting, such as chaparral, coastal scrub, or valley and foothill grassland. Pallid bats are very sensitive to human disturbance of roosting sites.

Occurrence within the Project Area

This species has been documented along Olema Creek and along Lagunitas Creek near Tocaloma (CDFW, 2017). Based on these occurrence records and presence of suitable foraging and night roosting habitat, the species has a moderate potential to occur in the project area.

Townsend's Big-eared Bat (*Corynorhinus townsendii*)

The Townsend's big-eared bat is found in humid coastal regions of northern and central California, in habitats that include coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows. Throughout most of its geographic range, this bat is most common in mesic sites. Known roosting sites in California include caves and lava tubes, as well as mine tunnels, buildings, and other human-made structures. It is highly sensitive to disturbance by humans.

Occurrence within the Project Area

The project area and surrounding forests provide suitable roosting habitat for this species. This species has been documented in the vicinity of both Olema and Tocaloma (CDFW, 2017). Trees with suitable cavities, crevices or exfoliating bark could be used for roosting by this species, which has a moderate potential to occur in the project area.

3.2.4 Methodology

The following discussion of potential impacts to special status species based on implementation of the proposed project is based on the potential effects of Project construction and operation. Construction impacts may result from in-channel enhancements, floodplain restoration, secondary channel creation and bank-stabilization.

3.2.5 Impact Analysis Alternative A: Action Alternative

The Action Alternative (Alternative A) entails actions to expand and restore the channel and floodplain geomorphic, hydrologic, and ecological function at two sites (Sites 1 and 2) and to enhance native vegetation and remove non-native vegetation at Site 3 along Lagunitas Creek through removing fill and remnants of structures built in the riparian corridor, creating floodplain and riparian habitat, while protecting stream banks below Sir Francis Drake. For a more detailed description of Alternative A, including proposed construction methodology and additional mitigation measures, please see Chapter 2, *Alternatives*.

Beneficial Effects

Implementation of the proposed project would improve habitat for listed fish species within the project area and immediate vicinity. In particular, listed salmonids (Coho and Chinook Salmon and steelhead) are expected to benefit significantly from improved hydrologic and habitat conditions. Instream enhancements, along with adjacent floodplain restoration, would increase available spawning and rearing habitat for anadromous fish species. Additionally, improved flow conditions after Project implementation would ensure that sediment deposition occurs in such a way that appropriate spawning conditions are maintained within the project area.

Beneficial effects of the proposed project on California freshwater shrimp include avoiding identified in-channel CFS habitat where possible, and offsetting temporary impacts to existing habitat through establishment of more extensive areas of similar habitat within each of the sites. New channel banks will be lined with structures that mimics undercut banks with overhanging roots. Summer habitat features would develop as vegetation planted as part of the revegetation

plan matures. Winter habitat features would develop as flows scour mobile substrate from banks. The proposed project would also reduce flow velocity and erosion in the vicinity of the restoration sites during high flow events. These anticipated outcomes would increase habitat area and improve quality of habitat for California freshwater shrimp. Other indirect effects may include minor changes in local drainage patterns, which would result in negligible effects to California freshwater shrimp and their habitat.

Implementation of the proposed project would increase the extent and quality of riparian habitats in the project area and would locally reduce streamflow velocities and erosion, enhancing habitat for northern spotted owl prey species and forage for owls and other raptors. These actions would have beneficial indirect effects on owl habitat in the project area.

Implementation of the proposed project would increase the extent and quality of aquatic and riparian habitats in the project area and would locally reduce streamflow velocities and erosion. Habitat identified at the project sites critical for special status species would be protected to the extent feasible These actions would have beneficial indirect effects on California red-legged frog and western pond turtle habitat in the project area.

Adverse Effects

Although no stream bypass or diversion will occur with this project, in-water construction and flow diversions have the potential to result in the short-term disturbance and resuspension of benthic sediments. Sediment resuspension has the potential to increase the exposure of harmful chemicals sequestered in the sediment to listed fish species and other aquatic receptors in the immediate area, and result in adverse water quality and biological effects. The potential effects of suspended sediments within the water column on fish include gill lacerations, increased coughing behavior, decreased feeding success, and avoidance behavior (Wilbur and Clarke 2001).

Suspended sediments in the water column can also lower levels of dissolved oxygen and increase the concentration of suspended solids. Substantially depressed oxygen levels may cause respiratory stress to aquatic life, and when levels are depressed enough, may cause mortality. However, increased turbidity and depressed oxygen levels would be relatively short-lived and generally confined to within a few hundred yards of the construction activity. Additionally, after initially high turbidity levels, sediments would disperse and background levels would be restored within hours of disturbance. Implementation of Mitigation Measures **MM BIO-1**, **MM BIO-2**, **MM BIO-4** below, and **MM HYD-1** described in Chapter 3.1, Soils and Water would reduce the adverse effects related to aquatic habitat and water quality and thus would not significantly affect overall habitat for listed fish species.

The Project could result in direct temporary disturbance effects on aquatic and riparian habitat in Lagunitas Creek, impacting California freshwater shrimp, California red-legged frog, western pond turtle, and other aquatic species. As discussed in Chapter 2, approximately 1.5 acres of existing riparian and upland habitat would be impacted, and approximately 1,600 linear feet (0.3 miles) of stream. Earthmoving adjacent to the creek could result in increased sediment loads, turbidity, and siltation. The accidental introduction of wash-water, solvents, oil, cement, or other pollutants during construction could also harm the aquatic environment. Removal of trees in the riparian habitat

would temporarily affect perennial stream habitat by reducing overstory shade, which may reduce habitat quality by increasing water temperatures and lowering dissolved oxygen levels. In the short term before vegetation matures and restores shade, there is a higher possibility of fish mortality from stranding in warm side channel pools.

Direct temporary effects to California freshwater shrimp could also occur during flow diversions around the work areas. If shrimp are present at the time of installation of flow diversions, they could be stranded or subject to disturbance through relocation. During diversion operations, short-term alterations to the channel bank are expected. During construction, work areas would be disturbed by flow diversions, vegetation removal, and installation of large wood structures along the channel bank. Implementation of **MM BIO-1**, **MM BIO-4**, and **MM BIO-5** below would reduce the adverse effect to California freshwater shrimp; therefore, the proposed project would not significantly affect this species or the overall population present within the project area.

California red-legged frog and western pond turtle are not likely to breed in the project area, but may be present during foraging or dispersal movements and could be subject to injury or mortality from construction activity or human traffic. Implementation of **MM BIO-1**, and **MM BIO-5** below would reduce the adverse effect to California red-legged frog and western pond turtle; therefore, the proposed project would not significantly affect these species.

Northern spotted owls are not likely to nest within the project area due to its proximity to a busy road and its fragmented forest. However, numerous detections of spotted owls occur in the immediate vicinity of the project area and thus, nearby nesting owls may be impacted by construction activities during nesting season. The construction seasonal window of June 15 to October 15 would include the later part of nesting season. Nesting owls and other nesting birds may be disturbed by tree removal or trimming or exposure to a substantial increase in noise or human presence during project activities. Foraging owls are not likely to be impacted because construction will occur only during daylight hours. Implementation of **MM BIO-5** below would reduce potential adverse effects to nesting birds and raptors.

Bats are likely to roost or forage within the project area. Implementation of **MM BIO 5** would provide for bat surveys in potential habitat and avoidance of impacts to roosting bats.

Rare plants could be present in the project area. Implementation of **MM BIO-3** below would document presence of rare plants in the project sites and ensure they would be protected or relocated with approval by the NPS, USFWS, and CDFW.

Cumulative Effects

Within the vicinity of the project area a series of restoration, enhancement, and capital improvement projects have been recently completed, are ongoing, or are reasonably foreseeable. Those that are relevant to special status species within the project area and immediate vicinity include the Lagunitas Creek Winter Habitat and Floodplain Enhancement Project, MMWD stream enhancement within Samuel P. Taylor State Park, the recently completed restoration along Jewell Creek, Olema Creek bridge replacement and ongoing NPS Japanese knotweed (*Fallopia japonica*) eradication efforts. A full list of projects that may result in cumulative impacts see

Chapter 2, *Alternatives,* Table 2-4. The timing of construction of these projects has the potential to increase temporary impacts on aquatic habitat by adding to sediment delivery, noise disturbance, and other impacts. However, all reasonably foreseeable projects would be subject to avoidance, minimization and mitigation requirements for protection of special status species.

Conclusion

The restoration of the Lagunitas Creek channel to more closely resemble the historic condition would improve habitat conditions for special status species within the project area. The improved instream habitat and riparian corridor would provide fish and other special status species with additional spawning and rearing habitat and improved water quality and streambank conditions. Implementation of the mitigation measures described in Section 3.2.7 would minimize adverse effects from construction.

3.2.6 Impact Analysis Alternative B: No Action Alternative

Under the No Action Alternative (Alternative B), the existing footings and foundations from former structures on Sites 1 and 2 would not be removed. No floodplain or riparian enhancement actions including grading, structures, bank stabilization, invasive plant removal, or revegetation would be implemented and the site would be left to naturally evolve over time.

Beneficial Effects

Under this alternative, no project actions would occur. Construction-related disturbances required foundation and debris removal and floodplain enhancements would be avoided, and temporary adverse impacts from construction activity, including noise disturbance, potential for special status species injury and mortality, and erosion and sediment delivery into the creek, would not occur.

Adverse Effects

Creek conditions and flow would remain the same as under current conditions. Current conditions include eroding banks, incised channels, and limited fish spawning habitat and amphibian breeding habitat. Under these conditions, salmon and steelhead populations are limited by the lack of winter habitat during high flow conditions (Stillwater Sciences 2008).

Cumulative Effects

There would be no contribution to cumulative impacts from the proposed project under this alternative, because project activities would not occur.

Conclusion

Without floodplain or riparian restoration actions, current failing banks would continue to erode causing a loss of mature native trees, input of fine sediment, and the remaining footings and foundations to fall into the channel. Loss of shade from mature trees, fine sediment, and concrete rubble in the channel would reduce potential spawning and rearing habitat for Coho Salmon and other special status fish species and limit the potential for these species' recovery.

3.2.7 Mitigation Measures

The below-outlined avoidance and minimization measures, best management practices (BMPs), and conservation measures are proposed to avoid and minimize potential Project impacts on special status species and their habitat. In addition to the Mitigation Measures listed below, **MM VEG-1** described in Chapter 3.3, Vegetation would avoid and minimize impacts to riparian vegetation. These measures would also protect and restore habitat for special status wildlife.

MM BIO-1 **Seasonal Avoidance of Sensitive Aquatic Species.** In-water construction work with the potential to result in short-term impacts to sensitive aquatic species, including project activities that are expected to create turbidity or disturb the streambed, shall be conducted only from June 15 through October 15.

MM BIO-2 **Relocation of Special Status Fish.** If necessary, fish shall be captured and relocated to avoid injury and mortality and minimize disturbance during construction. NPS would be the point of contact for any fish relocation activities and results. The following guidelines shall apply:

a. The project sponsor shall consult with NPS, with NOAA Fisheries (under Section 7 of the federal Endangered Species Act) and with CDFW (under Section 1600 of the California Endangered Species Act) to provide preservation and avoidance measures commensurate with the CDFW standards for the affected species.

b. The capture and relocation of Coho Salmon and coastal steelhead associated with work site clear-water creek diversions would require an Incidental Take Permit under Section 2081 of the California Fish and Game Code, or a Safe Harbor Agreement, to be issued by the CDFW. A Safe Harbor Agreement shall be obtained prior to implementing fish relocation actions.

c. Prior to and during the initiation of construction activities, a qualified CDFW- and NMFS-approved biologist and other approved fisheries biologists shall be present during installation and removal of clear-water creek diversions.

d. For sites that require flow diversion and exclusion, the work area will be blocked by placing fine-meshed nets or screens above and below the work area to prevent state or federally listed species from re-entering the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed to prevent fish from passing under the screen and avoid scour by flow. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked twice daily (at the beginning and end of each work day) and cleaned of debris to permit free flow of water. Block nets will remain in place in order to prevent fish from re-entering the project area following relocation.

e. Before removal and relocation begins, a qualified fisheries biologist will identify the most appropriate release location(s). In general, release locations should have water temperatures similar to (<3.6°F difference) the capture location and offer ample habitat (e.g., depth, velocity, cover, connectivity)

for released fish, and should be selected to minimize the likelihood of reentering the work area or becoming impinged on exclusion nets or screens.

f. The means of capture will depend on the nature of the work site, and will be selected by a qualified fisheries biologist. Complex stream habitat may require the use of electrofishing equipment (e.g., Smith-root LR-24 backpack electrofisher), whereas in outlet pools, aquatic vertebrates and invertebrates may be captured by pumping down the pool and then seining or dipnetting. Electrofishing will be used only as a last resort; if electrofishing is necessary, it will be conducted only by properly trained personnel following the NMFS guidelines dated June 2000 (NMFS, 2000).

g. When feasible, initial fish relocation efforts will be performed several days prior to the scheduled start of construction. To the extent feasible, flow diversions and species relocation will be performed during morning periods. The fisheries biologist will survey the flow exclosures throughout the diversion effort to verify that no state or federally listed fish or aquatic invertebrates are present. Afternoon pumping activities should generally not occur and pumping should be limited to days when ambient air temperatures are not expected to be high. Air and water temperatures will be measured periodically, and flow diversion and species relocation activities will be suspended if temperatures exceed the limits allowed by NMFS guidelines.

h. Handling of fish and aquatic invertebrates will be minimized. When handling is necessary, personnel will wet hands or nets before touching them.

i. Prior to translocation, any state or federally listed species that are collected during surveys will be temporarily held in cool, aerated, shaded water using a five-gallon container with a lid. Overcrowding in containers will be avoided; at least two containers will be used and no more than 25 fish will be kept in each bucket. Aeration will be provided with a battery-powered external bubbler. Fish will be protected from jostling and noise, and will not be removed from the container until the time of release. A thermometer will be placed in each holding container and partial water changes will be conducted as necessary to maintain a stable water temperature. Special-status fish will not be held more than 30 minutes. If water temperature reaches or exceeds NMFS limits, the fish and other aquatic species will be released and relocation operations will cease.

j. If state or federally listed fish are abundant, capture will cease periodically to allow release and minimize the time fish spend in holding containers.

k. Fish will not be anesthetized or measured. However, they will be visually identified to species level, and year classes will be estimated and recorded.

l. Reports on fish relocation activities will be submitted to CDFW and NMFS in a timely fashion.

m. If mortality during relocation exceeds three percent (or as determined by NMFS), relocation will cease and CDFW and NMFS will be contacted immediately or as soon as feasible.

MM BIO-3 Impacts to Rare Plants.

a. A qualified biologist shall conduct a pre-construction survey for special status plant species with the potential to occur within the area of disturbance. At least two surveys shall be completed, one in winter or early spring to capture the flowering period of Western leatherwood and one in summer to capture the flowering period of California bottle brush grass. The surveys shall be floristic in nature and shall follow the procedures outlined in the California Department of Fish and Wildlife Publication Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW, 2009).

b. If special status plant species are found, SPAWN shall coordinate with NPS, USFWS, and CDFW to provide preservation and avoidance measures commensurate with the standards provided in applicable NPS, USFWS, and CDFW protocols for the affected species. The preservation and avoidance measures shall include, at a minimum, appropriate buffer areas clearly marked during project activities with orange fencing, monitoring by a qualified plant biologist, and the development and implementation of a replanting plan.

MM BIO-4 Contractor Environmental Awareness Training and Site Protection. All construction personnel that are working in areas of potential endangered species habitat shall attend an environmental education program delivered by a qualified biologist prior to working on the project site. The program shall include an explanation as how to best avoid the accidental take of California freshwater shrimp, California red-legged frog, listed birds and fish species. The program shall also include how to identify and avoid Japanese knotweed, and what to do if new plants are found.

The training session shall be mandatory for contractors and all construction personnel. The field meeting shall include topics on species identification, life history, descriptions, and habitat requirements during various life stages. Emphasis shall be placed on the importance of the habitat and life stage requirements within the context of project maps showing areas where minimization and avoidance measures are being implemented. The program shall include an explanation of appropriate federal and state laws protecting endangered species.

The contractor shall provide closed garbage containers for the disposal of all trash items (e.g., wrappers, cans, bottles, food scraps). The site shall be cleaned of litter before closure each day, and placed in wildlife-proof garbage receptacles. Construction personnel shall not feed or otherwise attract any wildlife in the project area. No pets, excluding service animals, shall be allowed in the project area.

MM BIO-5 Avoid or Minimize Impacts to Special Status Species.

***California Freshwater Shrimp*:** Prior to commencing construction, trees and vegetation overhanging into the wetted creek channel lining the banks at each restoration site will be surveyed for the presence of undercut root masses (i.e., potential winter habitat). If trees with such features are identified, they will be

avoided during construction, as feasible. Avoidance measures will include adjusting grading limits. In addition, construction crews shall be directed to retain riparian vegetation near the margins of the low flow channel, as feasible. Avoidance measures may include adjusting grading limits and reducing the area of flow diversions. Large wood structures shall be placed and constructed to avoid existing habitat to the greatest extent feasible. If relocation is required, a qualified USFWS and CDFW-approved biologist will perform the relocation of California freshwater shrimp, according to the following measures:

a. At least 15 days prior to the onset of activities, the name(s) and credentials of biologists who will conduct California freshwater shrimp survey and relocation activities shall be submitted to the USFWS and CDFW for approval.

b. No in-channel work activities shall begin until proponent has received written approval from the USFWS and CDFW that the biologist(s) is qualified to conduct the work, and take authorization has been secured under FESA Section 7 and CESA Section 2081.

c. Before removal and relocation begins, the biologist shall identify the most appropriate release location(s). Suitable habitat is defined as creek sections that will remain wet over the summer and where banks are structurally diverse with undercut banks, exposed fine root systems, overhanging woody debris, or overhanging vegetation.

d. California freshwater shrimp shall be captured by hand-held nets [e.g., heavy-duty aquatic dip nets (12-inch D-frame net) or small minnow dip nets] and relocated out of the work area in the net or placed in buckets containing stream water and then moved directly to the nearest suitable habitat in the same branch of the creek.

e. No California freshwater shrimp shall be placed in buckets containing other aquatic species. Handling shall be minimized, as feasible.

f. California freshwater shrimp shall not be held more than 30 minutes.

g. Any California freshwater shrimp rescued or relocated shall be reported to the NPS, USFWS and CDFW.

h. Release locations should offer ample habitat and should be selected to minimize the likelihood of reentering the work area. To prevent California freshwater shrimp from reentering the work area, the channel will be blocked by placing fine-meshed nets or screens above and below the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked twice daily and cleaned of debris to permit free flow of water. At the completion of in-stream work, all temporary materials would be completely removed.

California Red-legged Frog and Western Pond Turtle:

a. The name(s) and credentials of the qualified biologist(s) to act as construction monitors shall be submitted to the USFWS for approval at least 15 days before construction work begins.

b. Vegetation shall be cleared to 18 inches prior to conducting surveys for California red-legged frogs.

c. No more than 24 hours before initial ground disturbance activities, including grading and excavation, an approved biologist shall conduct onsite monitoring for the presence of California red-legged frog and other special status species with potential to be present, such as western pond turtle, in the area where ground disturbance or vegetation removal shall occur. Areas of dense vegetation may be mowed or trimmed to 18 inches in height, in order to more effectively survey for frogs.

d. Vegetation may be cleared to ground level within 24 hours after being cleared for California red-legged frogs.

e. At the beginning of each workday that includes initial ground disturbance, including grading, excavation, and vegetation-removal activities, an approved biologist shall conduct onsite monitoring for the presence of these species in the area where ground disturbance or vegetation removal shall occur. Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fence.

f. All excavated or deep-walled holes or trenches greater than 2 feet deep shall be covered at the end of each workday using plywood, steel plates, or similar materials. Before such holes are filled, they shall be thoroughly inspected for trapped animals.

g. If a special status species is present within the exclusion fence area during construction, work shall cease in the vicinity of the animal, and the animal shall be allowed to relocate of its own volition. If the animal does not relocate of its own volition, the animal shall be relocated in accordance with the California Red-legged Frog Relocation Plan (Appendix E). NPS will be notified about any California red-legged frog sightings and removals.

h. The contractor shall maintain the temporary fencing—both exclusion fencing and protective fencing (if installed)—until all construction activities are completed. No construction activities, parking, or staging shall occur beyond the fenced exclusion areas. Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fence. After construction is completed, the exclusion fencing and associated debris shall be removed and stored or disposed of off-site.

Northern Spotted Owl and Nesting Birds: Tree removal activities will be avoided during the nesting season (February 1 to July 31) unless a nesting bird survey shows that no nesting activity is present. Prior to construction, a qualified biologist will conduct a nesting bird survey in the project area and areas within

1/2-mile. The four nearby spotted owl activity centers (Bike Path, McIsaac, Cheda Creek, and Jewel Trail) will be avoided with a buffer of 1/4-mile during the active nesting season. NPS will conduct spotted owl nesting surveys if necessary, according to USFWS protocol. Other nesting birds will be avoided by a suitable buffer determined in coordination with NPS. Construction work may continue outside of the no-work buffer.

Bats: Prior to project construction, a qualified bat biologist shall conduct a pre-construction survey for roosting bats in trees to be removed or pruned and structures to be demolished. If no roosting bats are found, no further action is required. If a bat roost is found, the following measures shall be implemented to avoid impacts on roosting bats.

a. If active maternity roosts are found in trees or structures that will be removed or demolished as part of project construction, tree removal or demolition of that structure shall commence before maternity colonies form (generally before March 1) or after young are flying (generally by July 31). Active maternal roosts shall not be disturbed.

b. If a non-maternal roost of bats is found in a tree or structure to be removed or demolished as part of project construction, the individuals shall be safely evicted, under the direction of a qualified bat biologist and with approval from NPS. Removal or demolition shall occur no sooner than at least two nights after the initial minor site modification (to alter airflow). Departure of the bats from the construction area will be confirmed with a follow-up survey prior to start of construction.

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3.3 Vegetation

3.3.1 Introduction

This section describes vegetation resources in the project area. Potential impacts to the project area are evaluated in terms of their effect on vegetation resources. Where applicable, mitigation measures are recommended to minimize the potential for adverse effects on vegetation resources. In addition, this section summarizes the applicable laws, regulations, and policies associated with protection of vegetation resources, including special-status plant species and biological resources in general.

3.3.2 Regulatory Framework

NPS Natural Resource Policies and Guidelines

NPS has developed specific guidelines for the management of natural resources. The guidelines provide for the management of native and nonnative plant and animal species. They are designed to assist parks in developing resource management plans and action plans for specific park programs in all park management zones and special use zones as described in the NPS Management Policies 2006 and articulated in each park general management plan. The NPS Management Policies 2006 direct park managers to preserve natural resources, processes, systems, and values of park units in an unimpaired condition to perpetuate their inherent integrity and to provide present and future generations with the opportunity to enjoy them. Natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and animal communities. NPS will strive to understand, maintain, restore, and protect the inherent integrity of the natural resources, processes, systems, and values of the parks. These are described generally in the 1916 NPS Organic Act and in the enabling legislation or presidential proclamation establishing each park.

3.3.3 Affected Environment

Biologists from Environmental Science Associates and SPAWN conducted a field survey to map vegetation communities within the project area on September 17, 2014. Vegetation communities were mapped by dominant canopy and understory plant species. The National Park Service has provided additional mapping locations of Japanese Knotweed within the project area base on survey conducted in the summer of 2017. These patches within the project area are represented on the design plans.

Tree inventories of the project were completed as part of site topographic surveys by DobleThomas & Associates in December 2016. All trees within the impact footprint of the proposed project were identified to genus and tallied. The tree inventory identified “trees” as tree species exceeding 10 inches in diameter at breast height (DBH).

The project area includes three restoration and enhancement sites within Lagunitas Creek. The project area is dominated by riparian vegetation along the creek with adjacent upland communities.

The project area generally contains Valley Foothill Riparian and Coast Oak Woodland habitat types within the undisturbed locations adjacent to the creek and along the creek bank (Mayer and Laudenslayer, 1988). Annual Grassland, Urban, and Coastal Scrub habitat types occur within the disturbed locations, which occur at level areas adjacent to the top of bank (Mayer and Laudenslayer, 1988). Understory vegetation and trees mapped at the three sites are shown in **Figures 3.3-1** and **3.3-2**. Not all of the vegetation at Site 3 was mapped since the project area has shifted since the vegetation mapping was been completed. However, the vegetation within the area of Site 3 was observed during the wetland delineation survey on March 28, 2017 and contains similar riparian vegetation found at the other sites and can be designated more broadly as Valley Foothill Riparian habitat.

There is high species diversity in the understory and canopy throughout the project area with a mix of native and non-native species. Common native understory species mapped include: California blackberry (*Rubus ursinus*), poison oak (*Toxicodendron diversilobum*), mugwort (*Artemisia douglasiana*), and sword fern (*Polystichum munitum*). There are small, isolated patches of redwoods (*Sequoia sempervirens*) in the project area. Common non-native species encountered in the understory include: English ivy (*Hedera helix*), poison hemlock (*Conium maculatum*), Himalayan blackberry (*Rubus armeniacus*), bamboo (*Phyllostachys* spp.*)* and bull thistle (*Cirsium vulgare*). The canopy is more dominated by native species than the understory and includes: California bay (*Umbellularia californica*), California buckeye (*Aesculus californica*)**,** willows (*Salix lasiolepis, S. sitchensis*), and red alder (*Alnus rubra*). All areas near existing structures and disturbed land are dominated by non-native species, while areas with no man-made structures are dominated by native species (ESA and SPAWN, 2016).

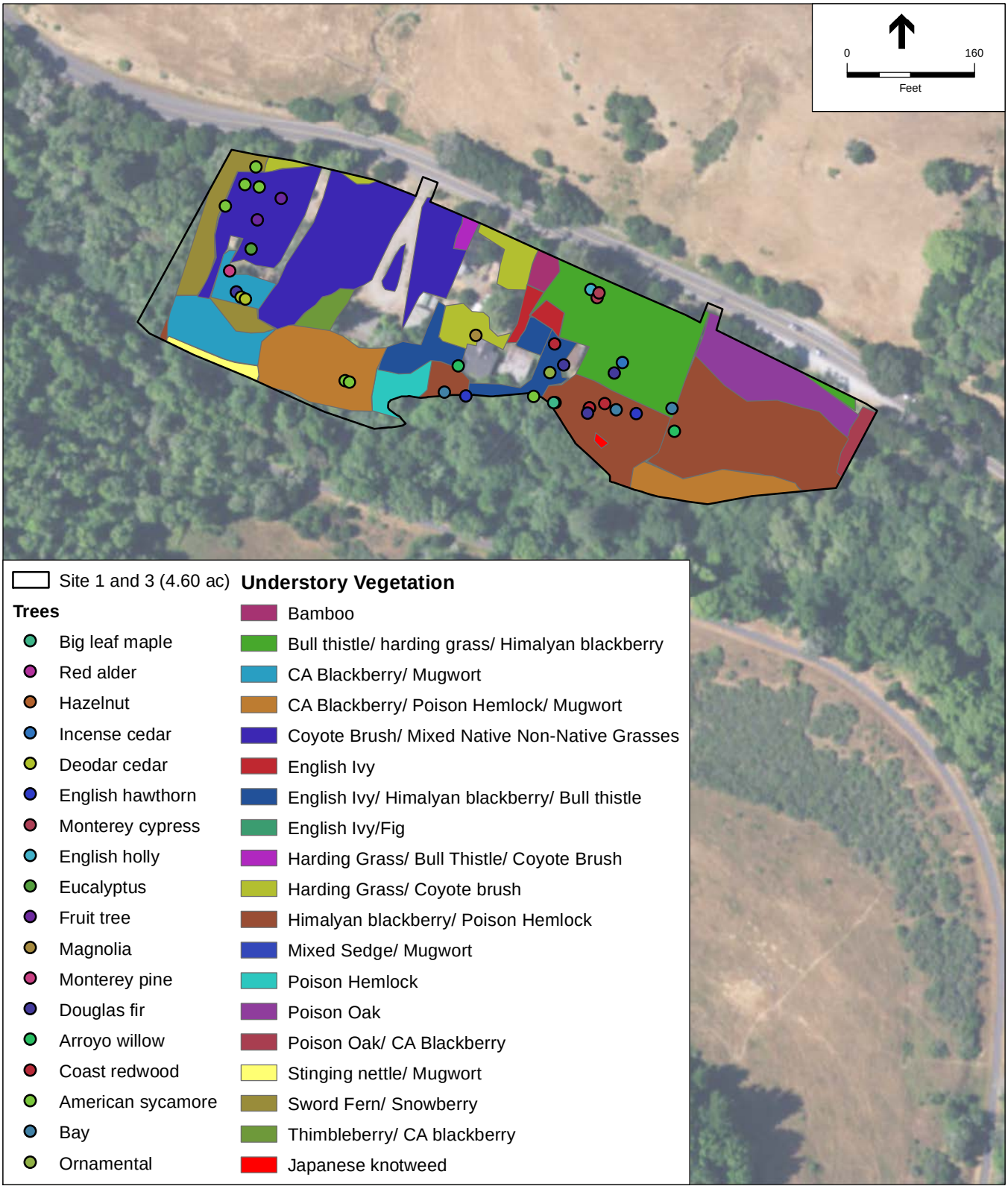
No special-status plant species or sensitive vegetation communities were observed on the project sites during a reconnaissance survey and wetland delineation conducted on March 28, 2017. However, no rare plant surveys have been completed at the site according to CDFW and CNPS guidelines. The tree inventory conducted by DobleThomas & Associates in 2016 identified 30 trees greater than 10 inches dbh that would be potentially removed by the proposed project (predominantly willow and bay trees).

3.3.4 Methodology

This impact analysis is based on the results of field survey of the project sites, the tree inventory, and records searches. For the purposes of this document, potential impacts are generally described in terms of the nature of the impact, duration, intensity, type of impact (direct, indirect, and/or cumulative), and context.

3.3.5 Impact Analysis Alternative A: Action Alternative

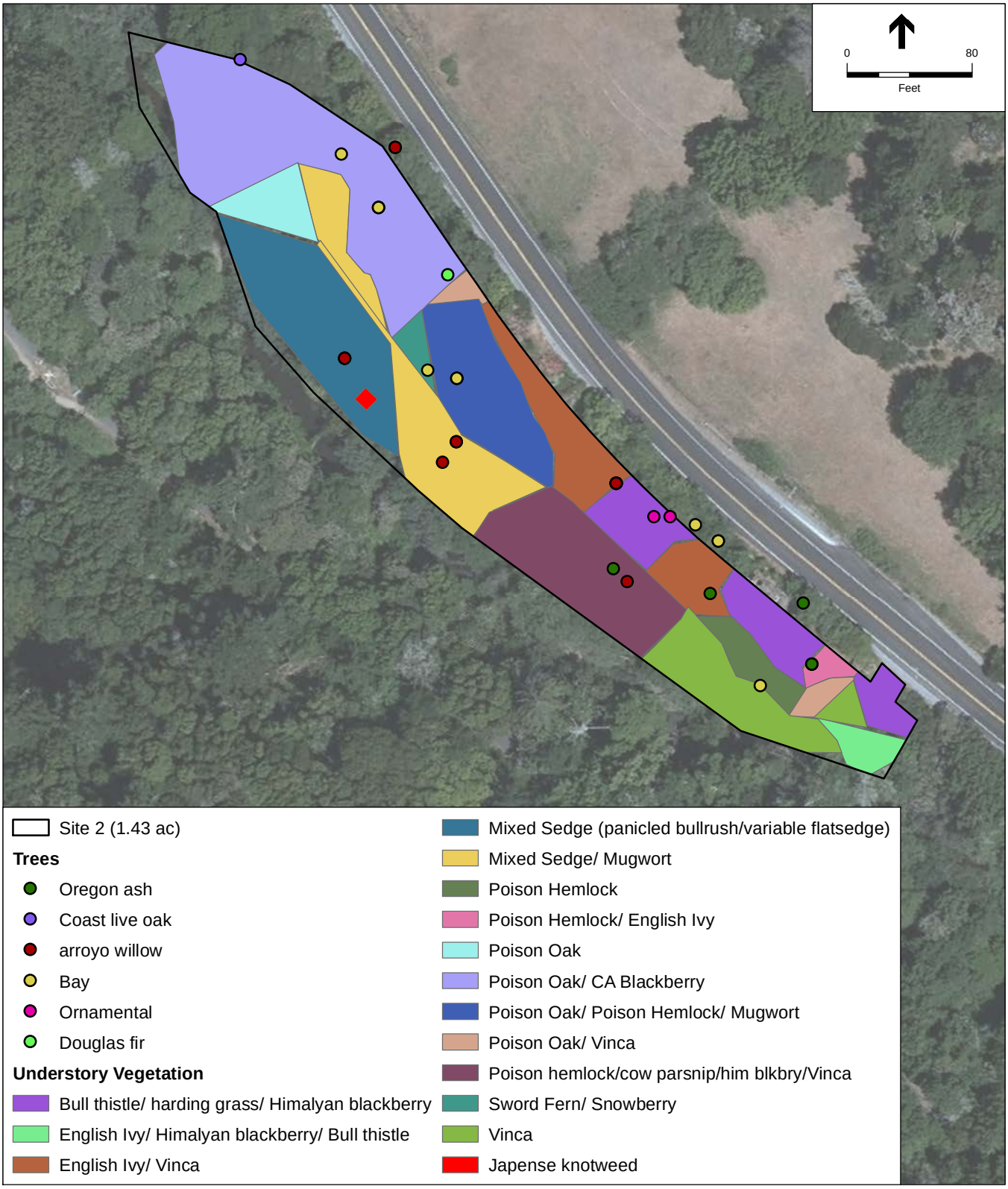
Direct impacts to vegetation resources in and surrounding the project area would be associated with construction activities (e.g. clearing vegetation along the reconnected floodplain channels and the installation of large woody debris structures adjacent to Lagunitas Creek) and the intended increased frequency of inundation of the existing floodplain within the targeted stretch of Lagunitas Creek. Construction areas cleared from vegetation would be replanted with native



SOURCE: aerial (ESRI 2017), study area, understory, and trees (ESA and SPAWN 2016), Japanese knotweed (NPS 2017)

Lagunitas Creek Floodplain and Riparian Restoration Project . 150145

Figure 3.3-1
Site 1 and 3 Vegetation



SOURCE: aerial (ESRI 2017), study area, understory, and trees (ESA and SPAWN 2016); Japense knotweed (NPS 2017)

Lagunitas Creek Floodplain and Riparian Restoration Project . 150145

Figure 3.3-2
Site 2 Vegetation

riparian and wetland species. Long-term changes in the frequency and duration of inundation of the floodplain and the volume of flow would be expected to result in changes in the composition of the plant community within the floodplain. To some degree, those changes would also be expected to affect ecology within the riparian corridor adjacent to the affected area. Both direct effects related to disturbance for construction and indirect effects related to altered abiotic conditions are addressed below.

Beneficial Effects

The proposed project would expand and restore the channel and floodplain geomorphic, hydrologic, and ecological function at two sites and enhance native vegetation and remove non-native vegetation another site along Lagunitas Creek through removing fill and remnants of structures built in the riparian corridor, creating floodplain and riparian habitat, while protecting stream banks below Sir Francis Drake Blvd. The intent of this alteration is to restore a pattern of floodplain connectivity and inundation that more closely approximates the historic flood regime that existed within Lagunitas Creek prior to the damming of Lagunitas Creek. The restoration and enhancement of natural hydrological processes and habitat within the creek is considered a beneficial effect for vegetation resources. It is possible that the enhancement of salmonid wintering habitat could result in top-down ecological effects that could influence the distribution or composition of plant species within the project area, but such changes are expected to be limited or imperceptible. Where non-native plants (especially non-native invasive plants such as Japanese knotweed) are removed during construction, they would be replaced with native plants using the Revegetation and Maintenance Plan developed in the Lagunitas Creek Floodplain and Riparian Enhancement Feasibility Study (ESA, SPAWN 2015).

Adverse Effects

Adverse effects to vegetation related to the proposed project would predominantly be limited to construction impacts. The construction work area for Alternative A would encompass approximately 6.03 acres that would temporarily impact existing riparian and upland habitat, and potential rare plant species. Construction related effects would include vegetation clearing for construction access, and the clearing of valley foothill riparian vegetation for excavation of the proposed side channel and alcove features at Sites 1 and 2. The geographic extent of adverse effects on vegetation related to project construction would be limited to the immediate vicinity of the project and would be focused on staging areas and areas cleared to reestablish floodplain habitat.

Approximate 1.51 acres of predominantly riparian woodland would be removed for the excavation of the restored floodplain. To the extent feasible native plant material would be salvaged and used at the site post-construction. The intensity of these impacts within the small geographic area would be considered limited. Riparian habitat in general represents a relatively small percentage of total land cover across the regional landscape and therefore is of relatively high conservation value. Although the proposed impacts would remove riparian habitat within the proposed new floodplain, the total area of riparian habitat would remain roughly equivalent because the new, more frequently inundated side channel, alcoves, and floodplain would support the transition of previously upland habitat outside the hydrologic influence of the riparian

corridor into new riparian habitat. The majority of the predominantly riparian vegetation that would be displaced would regenerate within a few growing seasons. The project would result in a short-term adverse effect to the total area and amount of cover of riparian habitat within the project area.

Rare plants may be adversely impacted by construction activities. To ensure that rare plants are not adversely impacted, implementation of rare plant surveys would be required (see Chapter 3.2, Special Status Species for Mitigation Measure **MM BIO-3** and for more information on rare plants that could occur within the project area).

Indirect effects related to construction of the proposed project could include creating a favorable environment for invasive non-native or ruderal plant species that are highly competitive in disturbed environments. The proposed project involves 6.03 acres of disturbance in total, including clearing, grubbing, and excavation and grading. Replanting native vegetation and monitoring the replanting effort would be required to reduce the possibility of non-native species establishing in areas disturbed by the proposed project. Replanting with native plant material is included in the list of Director's Order 77-1 BMPs, which would be implemented for the proposed project (see Appendix A). Japanese knotweed and other invasive species could find the disturbed areas within the project area very favorable conditions. Implementation of **MM VEG-3** (invasive species management), described at the end of this chapter, would reduce the potential adverse effect.

The revegetation effort may adversely impact the habitat surrounding the project area and within the project area by bringing in or allowing native and/or non-native vegetation and/or plant pathogens that do not currently occur within the Lagunitas Creek watershed. In order to ensure that the replanting effort does not adversely impact existing habitats and provides a thoughtful plan for pre-construction vegetation planning, revegetation, and post-construction monitoring, implementation of **MM VEG-2** (habitat restoration and monitoring plan) would be required. To further ensure the proposed project would not result in adverse indirect impacts on native plant species, implementation of **MM VEG-1** (general vegetation protection), and implementation of **MM BIO-4** (conduct rare plant surveys) would be required. After implementation of MM VEG-1, MM VEG-2, and MM BIO-4, the intensity of this potential adverse effect would be minimized and the effect would be very limited.

Cumulative Effects

Cumulative effects to vegetation would result if projects in proximity to the proposed project were implemented concurrently or in close succession such that the limited impacts of the projects, when considered in isolation, compound to result in an adverse effect by magnifying the geographic context, intensity, or duration of a particular effect. The proposed project could occur within the same time frame as a number of other small restoration projects or small culvert or bridge replacement projects in the region as described in Chapter 2, *Alternatives*, Table 2-4. However, because the proposed project is not directly adjacent to these other projects and because the project's potential effects related to disturbance, like those of other projects, would be addressed through replanting native plant species, the proposed project would not contribute considerably to any potential cumulative effects.

Conclusion

The proposed project effects on vegetation resources would be primarily localized and beneficial in the long term, because the project would implement strategies to control long-term channel incision and to restore natural hydrology and species habitat. The potential for adverse effects to vegetation resources is primarily limited to short-term effects during and immediately following construction/installation activities in the local area and immediately downstream. Implementation of **MM-BIO-4**, **MM VEG-1**, **MM VEG-2, and VEG-3** would minimize short-term construction-related effects and long-term effects to vegetation communities within the project area. On a cumulative scale, the project is one of several actions being implemented throughout the watershed to improve water quality and species habitat within Lagunitas Creek.

3.3.6 Impact Analysis Alternative B: No Action Alternative

Under this alternative no direct action would occur as a result of the project; therefore, vegetation would not be disturbed. Adverse effects to vegetation related to construction of the proposed project would not occur under this project. Indirect effects related to construction of the proposed project that could include creating a favorable environment for invasive nonnative or ruderal plant species that are highly competitive in disturbed environments would also not occur under the No Action Alternative. The No Action Alternative would have no effect in combination with cumulative impacts in the project area. Potential benefits resulting from invasive non-native plants removal and native revegetation proposed under Alterative A would also not occur under this alternative.

3.3.7 Mitigation Measures

The following measures will be implemented to minimize or mitigate impacts to vegetation and reduce the spread of invasive species. These measures are specific to the project area, which encompasses the project construction limits.

MM VEG-1 General Native Vegetation Protection.

a. Before construction begins, the project engineer and a qualified biologist will identify locations for equipment and personnel access and materials staging that will minimize riparian vegetation disturbance.

b. During construction, as much native understory brush and as many native trees as possible will be retained. The emphasis will be on retaining shade-producing and bank-stabilizing vegetation. Woodrat nests will be avoided.

c. All trees to remain during construction within the grading area will be protected and trimmed in the fall or winter, if necessary, to ensure their trunks and/or limbs are not disturbed during construction.

d. When heavy equipment is required, unintentional soil compaction will be minimized by using equipment with a greater reach, or using low-pressure equipment. Disturbed soils will be decompacted when work is completed.

e. All vehicles and equipment entering each project site (Sites 1, 2, and 3) shall be clean of noxious weeds and free from oil leaks, and are subject to inspection. Noxious weeds could spread between sites as well as from outside the project area. All construction equipment shall be washed thoroughly to remove all dirt, plant, and other foreign material prior to entering and leaving the project area. Particular attention shall be shown to the under-carriage and any surface where soil containing exotic seeds may exist. These efforts are critical to prevent the introduction and establishment of non-native plant species into each project site. Arrangements shall be made for inspections of each piece of equipment before entering each project site, and records of inspections will be maintained. Equipment found operating on the project site that has not been inspected or has oil leaks will be shut down and may be subject to citation.

f. Certified weed-free permanent and temporary erosion control measures shall be implemented to minimize erosion and sedimentation during and after construction.

g. The project sponsor shall conform to the Federal Seed Act, the Federal Noxious Weed Act, and applicable state and local seed and noxious weed laws.

h. Nursery operations where plants are stored, propagated, or purchased must demonstrate implementation of best management practices to reduce pest and pathogen contamination within their nursery.

i. Any disturbed and decompacted areas outside the restoration area will be revegetated with locally native vegetation found in the Lagunitas Creek Watershed.

j. Revegetated areas shall be protected and cared for, including watering when needed, until restoration criteria have been met under project permits and/or NPDES standards. Revegetated areas shall be monitored in accordance with permit requirements to ensure success criteria are met.

MM VEG-2 Vegetation Monitoring and Management Plan.

a. SPAWN shall prepare a Vegetation Monitoring and Management Plan in consultation with NPS. The plan shall describe required salvage and replanting protocols prior to and after construction is complete. This plan shall include, but not be limited to, protocols for replanting of vegetation removed prior to or during construction, and management and monitoring of the plants to ensure replanting success. To the extent feasible and within the goals of the restoration project, native riparian vegetation within the project area shall be salvaged prior to construction and replanted after construction is completed. Areas impacted from construction-related activity shall be replanted or reseeded with native trees, shrubs, and herbaceous perennials and annuals from the watershed or nearby watershed under guidance from NPS-PRNS biologists.

b. Replanting shall be conducted using NPS standard operating procedures, such as preparation of soil conditions, use of NPS approved native plants,

plant protection, irrigation or watering if necessary, and control of aggressive nonnative species.

c. SPAWN shall submit the pre-construction survey protocols for all special-status species and the Vegetation Monitoring and Management Plan to NPS for review and approval as part of the Special Use Permit approval.

d. To the extent feasible, SPAWN shall use local plant materials for revegetation of the disturbed area. The plant materials shall include local cuttings from the local watershed or from adjacent watersheds. The Vegetation Monitoring and Management Plan shall take into account that use of container plants that meet this source criteria may add additional time to the revegetation process in that the materials need to be collected and provided to a contractor well in advance before the expected planting date. This will ensure that the seeds can be collected during the appropriate season and the container plants will be of an appropriate size for out-planting. Using local cuttings can reduce the length of this phase.

MM VEG-3 **Invasive Plants.** The following steps will be taken to minimize the spread of invasive plants in the Lagunitas Creek watershed:

a. Construction activities will be planned and laid out to avoid any existing Japanese knotweed as much as possible, with the goal of avoiding all existing patches (this includes any part of the site that would experience disturbance – such as equipment travel, soil movement, significant vegetation removal and rerouting of the creek).

b. A 20-foot buffer will be demarcated with orange fencing around these project areas so that no travel will occur within the area of expected above and below ground FAJA growth. SPAWN to provide materials, and NPS to install fencing.

c. A Japanese knotweed site (aka FAJA Buffer Zone) is defined as the perimeter of the 2017 survey extent of the site plus a buffer of 20 feet.

d. Disturbance is defined as driving across site, excavating, or anything that will render the site more vulnerable to erosion in the future.

e. If sites cannot be avoided SPAWN will submit a request and rationale for not being able to avoid the FAJA Buffer Zone. SPAWN will be responsible for any monitoring and treatment of these penetrated zones. Crane mats will be used in the area of movement within the buffer zone. No construction or travel will take place within the 2017 FAJA footprint. This includes no vegetation removal within the small footprint unless approved of by the NPS FAJA point of contact.

f. SPAWN will conduct a botanical survey in June for FAJA. The presence of this species will be mapped as a point and an estimation of how large the site is (square meters, % cover, numbers of stems and a column for comments, and another for an estimation whether the site can be avoided). Point data will be sent as a shapefile to NPS and the table in excel.

g. Invasive species, identified below, will be treated before the migration of heavy equipment and staging within the project area. The removal of these species will be with manual equipment. The NPS may treat 2017 FAJA patches in autumn of 2018 while construction is occurring. Construction activities and equipment will be away from 2017 FAJA sites so NPS can treat the patches when appropriate. SPAWN will be responsible for the treatment of non-FAJA invasive species by manual removal. Many invasive species are growing on the disturbed fill pads where old structures were located. These include bull thistle, poison hemlock, Himalayan blackberry, and periwinkle (vinca). SPAWN will work to prevent these species from seeding onto the site prior to construction activities through cutting, mowing, and manual pulling. During the grubbing phase of the project, SPAWN will work with the contractor(s) to scrap the topsoil from the fill pads and carefully discard these spoils and transport the material to a landfill where the material can be capped. Removal of the seed bank of these invasive species will help prevent the recolonization of these plants following construction.

h. Any patches of Japanese knotweed that cannot be avoided will be excavated to a depth of 10 feet and a perimeter of 20 feet from the edge of the population. Any excavations will be backfilled with local, native soil. Material will be buried to a depth of 15 feet and filled and compacted with native soil on site. The footprint of this activity will be scraped to a depth of 3" to skim any material dropped – or – if this is considered too onerous, an approved containment of the material during the migration process should be outlined and NPS approved three months before the start of the project.

i. If there is no other option but to work within the FAJA buffer zone, SPAWN will provide written plans and justifications for not being able to adhere to this activity and how alternatives were considered. Both a NPS and SPAWN representative will replace orange fencing to accommodate this adjustment. SPAWN shall notify NPS of the construction schedule 3 weeks in advance of activity to allow NPS to observe and monitor as seen fit Excavation of FAJA will require a full time NPS monitoring and documentation.

j. SPAWN will coordinate with NPS to have the FAJA patches within the project area treated with herbicide by NPS crews during construction activities when it is most optimal for herbicides to be effective.

k. NPS Monitoring is secondary to a SPAWN biomonitor, however, the selection of the monitor should have solid experience in monitoring construction projects for biological concerns. NPS should be given a minimum of a two week notice on schedule so that NPS visits to the site can be planned in advance.

l. SPAWN monitor should keep the NPS contacts apprised on a weekly basis and if there are problems or concerns all park contacts should be emailed. In particular, any unexpected actions should be included in this report (emergency actions). All other changes need to go through the approval process outlined by the park.

m. All methods proposed for FAJA mitigation are the ultimate responsibility of SPAWN and will be researched thoroughly well in advance of project dates (e.g. fumigation, incineration, working with County on options, etc.).

n. SPAWN should keep all contractors apprised of any herbicide activity that is planned.

o. Following construction, SPAWN will coordinate post-construction monitoring with NPS and conduct surveys for Japanese knotweed along the riparian area as an element of the project's effectiveness monitoring plan. Surveys will include the sites and the downstream areas of influence created by the new structures (minimum of ¼ river mile).

p. SPAWN will participate in monthly monitoring from March to July of FAJA growth at the restoration sites as a measure of first response to FAJA colonization following construction. This will include surveys for sprouts and documentation of their proximity to the OHWM and estimated stem count. If any new patches are found within the SPAWN project sites, SPAWN will document these with GPS and submit to NPS. If SPAWN or NPS documents new FAJA patches within the project sites that are below the OHWM, SPAWN will implement a manual treatment regime consistent with the NPS protocol of carful removal of entire root masses and lateral roots by hand and discard into black plastic garbage bags. This treatment will occur monthly. If new patches are discovered above the OHWM, NPS may apply herbicide treatment when optimal. SPAWN shall be responsible for monitoring FAJA within the project footprints and treating manually if new patches are found below the OHWM for a period of 5 years following construction.

q. SPAWN should be cognizant of the potential for movement of FAJA from MMWD's site 1 and 2 just upstream. Survey's should be conducted for 5 years after the restoration activities.

r. All activities shall be approved by the Water Quality Control Board, California Department of Fish and Wildlife, and PORE staff.

s. Care for other key non-natives on site:

    1. Himalayan blackberry
    2. Greater periwinkle
    3. Montbretia or Crocosmia
    4. Bull thistle
    5. Poison hemlock
    6. Forget-me-not

NPS Staff will provide:

a. SPAWN with a schedule of herbicide applications, safety data sheets and herbicide labels, and details around re-entry times. SPAWN will be responsible for working with contractors and staff to ensure this is communicated and re-entry is clear.

b. One primary project manager for the restoration projects that will attend meetings, and be able to provide insight on the group of cross-discipline issues. This project manager will need to provide updates to the NPS staff and ensure that NPS has representation at meetings.

c. GPS points and other data on Japanese knotweed will be provided to SPAWN. SPAWN will continue to coordinate and collaborate with NPS on NPS's Japanese knotweed eradication efforts on NPS lands within the Lagunitas Creek watershed.

d. NPS will make spontaneous visits and will be equipped with proper PPE (hard hats, vests, etc).

General Suggestions to be vetted by PORE staff:

a. SPAWN to host pre construction meeting with calendar of events for all PORE and regulator staff.

b. Identify a mechanism for reporting issues to park (oil spills, resource concerns, issues with regulators.

c. Demonstrate they have clear crosswalking of all FAJA sites, and resource concerns via integrated mapping.

d. Any change of plans will be approved by the project manager at the park and all parties involved will be notified.

e. Clarify for project manager what the scope of authority is and what the process is for stopping construction (if needed). Hopefully this won't be needed, but without this clarity it is ambiguous.

f. Identify what repercussions will be if mitigation and agreements to plans are not in accordance with actions.

Communications:

a. At the earliest possible juncture, provide park with a preliminary and final map (and shapefiles) of construction zone with all areas identified (access, staging, installation sites, and buffer). The nature of the sites should be well marked (so person interpreting it will know what the proposed action will entail).

References

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3.4 Wildlife

3.4.1 Introduction

This section addresses impacts to general (non-special-status) wildlife species in the project area. The project site is located in western Marin County in the Central California Chaparral and Oak Woodlands Ecoregion, in close proximity to the Coast Range Ecoregion, characterized by a Mediterranean climate with cool, moist winters and hot, dry summers. The climate is temperate, with mean annual rainfall of approximately 52 inches (MMWD 2017) and mean annual temperatures ranging from a low of 48°F to a high of 68°F (U.S. Climate Data 2017). Natural vegetation includes chaparral and oak woodlands with extensive grassland and shrubland cover. The low mountains and foothills of the ecoregion border or parallel the Pacific Ocean from Mexico to Point Reyes, California. Most of the ecoregion consists of rangelands classified as grassland/shrubland and forest land covers (USGS 2012a).

The project site is in close proximity to the Coast Range Ecoregion and shares some characteristics with this region. Almost the entire Coast Range Ecoregion lies within 60 miles of the coast. Topography is highly variable, with coastal mountain ranges and valleys ranging from sea level to over 3,200 ft. in elevation. A maritime climate, along with high topographic relief, results in substantial but regionally variable, rainfall amounts, ranging from 50 in. to more than 130 in. per year. The favorable climate of the Coast Range Ecoregion supports coast redwoods (*Sequoia sempervirens*) along its southern coast, as well as Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) further inland. Although much of the forest is heavily managed for logging, the ecoregion still supports areas of old-growth forest in the Pacific Northwest (USGS 2012b). These varied habitats are home to many species of fish, amphibians, reptiles, mammals, birds and invertebrates.

3.4.2 Regulatory Framework

Migratory Bird Treaty Act

The Federal Migratory Bird Treaty Act (MBTA) (16 USC 703) authorizes the U.S. Secretary of the Interior to protect and regulate the taking of migratory birds. It establishes seasons and bag limits for hunted species and protects migratory birds, their occupied nests, and their eggs (16 USC 703; 50 CFR 10, 12). Most actions that result in taking or in permanent or temporary possession of a protected species constitute violations of the MBTA. Take, under the Migratory Bird Treaty Act, is defined as the action of, or an attempt to, pursue, hunt, shoot, capture, collect, or kill (50 CFR 10.12). The definition includes “intentional” take (take that is the purpose of the activity in question) and “unintentional” take (take that results from, but is not the purpose of, the activity in question).

Executive Order 13186, Responsibilities of Federal Agencies to protect Migratory Birds

The Executive Order 13186, Responsibilities of Federal Agencies to protect Migratory Birds (signed January 10, 2001) directs each federal agency taking actions that could have a negative

impact on migratory bird populations to work with USFWS to develop a Memorandum of Understanding to promote the conservation of migratory bird populations. The National Park Service Memorandum of Understanding (MOU) was signed in 2010 (NPS 2010). It establishes how USFWS and NPS will promote conservation of migratory birds and identifies NPS actions that could result in take or birds or impacts to habitat, and identifies NPS actions to reduce or eliminate the risk of unintentional take of migratory birds.

NPS Management Policies 2006

The National Park Service will preserve and protect the natural resources, processes, systems, and values of units of the national park system in an unimpaired condition to perpetuate their inherent integrity and to provide present and future generations with the opportunity to enjoy them.

3.4.3 Affected Environment

The project area consists of aquatic (riverine) and riparian habitat for both common and special-status wildlife species. Special status wildlife species are discussed in Section 3.3, *Special-Status Species*.

Common terrestrial wildlife species likely to occur within the redwood forest and riparian woodland in the Study Area include black-tailed deer (*Odocoileus hemionus columbianus*), raccoon (*Procyon lotor*), dusky-footed woodrat (*Neotoma fuscipes*), gray fox (*Urocyon cinereoargenteus*), bobcat (*Lynx rufus*), opossum (*Didelphis virginiana*), coyote (*Canis latrans*) and deer mouse (*Peromyscus maniculatus*). Many migratory bird species are likely to nest and forage in the Study Area, including songbirds such as Wilson's warbler (*Cardellina pusilla*), Pacific-slope flycatcher (*Empidonax difficilis*), chestnut-backed chickadee (*Poecile rufescens*), golden-crowned kinglet (*Regulus satrapa*), black phoebe (*Sayornis nigricans*), American robin (*Turdus migratorius*) and belted kingfisher (*Megaceryle alcyon*), and raptors such as American kestrel (*Falco sparverius*) and red-shouldered hawk (*Buteo lineatus*). Common aquatic species occurring in Lagunitas Creek include sculpin (*Cottus* spp.), Sacramento sucker (*Catostomus occidentalis*) and threespine stickleback (*Gasterosteus aculeatus*), the semi-aquatic river otter (*Lontra canadensis*), amphibians such as California newt (*Taricha torosa*) and slender salamander (*Batrachoseps attenuatus*), and reptiles such as western fence lizard (*Sceloporus occidentalis*) also occur in the Study Area (MMWD 2016, ESA and SPAWN 2016).

3.4.4 Methodology

To evaluate the impact of this project on wildlife, the following parameters were considered:

1. The spatial distribution of the species affected
2. The proportion of the species' range affected by the action
3. The life history of the species and its sensitivity to disturbance.

3.4.5 Impact Analysis Alternative A: Action Alternative

The Action Alternative (Alternative A) entails actions to expand and restore the channel and floodplain geomorphic, hydrologic, and ecological function at two sites (Sites 1 and 2) and to enhance native vegetation and remove non-native vegetation at Site 3 along Lagunitas Creek, through removing fill and remnants of structures built in the riparian corridor, creating floodplain and riparian habitat, while protecting stream banks below Sir Francis Drake Boulevard. For a more detailed description of Alternative A, including proposed construction methodology and best management practices, please see Chapter 2, *Alternatives*.

Beneficial Effects

The project's effects on wildlife resources would be beneficial over the long-term, by implementing strategies to control long-term channel incision, reduce erosion and sediment deposition, and to restore natural hydrology and vegetative cover.

The proposed project has been designed to modify hydrologic conditions within Lagunitas Creek. The aim is to enhance existing floodplain and side channels and slow the rate of flow in order to facilitate the development of gravel beds which would provide more winter habitat and spawning habitat for Coho salmon and steelhead. Other fish and aquatic wildlife would also have enhanced habitat conditions in the riparian corridor. The removal of invasive plant species and restoration of natives would improve forage for native birds and mammals and provide for nesting and roosting sites. The removal of structures and foundations in the creekbed would improve its use as a wildlife corridor and fish passage. The project would create over 2,000 feet of California freshwater shrimp habitat of comparable or improved quality to the existing habitat. The restoration of Coho salmon and steelhead trout populations could also benefit wildlife that feed on salmon or steelhead (e.g., sculpin, kingfisher and river otter).

Adverse Effects

Construction impacts would include vegetation removal, causing loss of nesting habitat and cover for riparian species, impacting approximately 1.6 acres of existing riparian and upland habitat, and approximately 1,600 linear feet of the creek. Construction access routes and staging areas for equipment would be necessary within the project limits, with potential for injury or mortality to small mammals, reptiles and amphibians. In addition, noise disturbance could cause nest or habitat abandonment by birds or bats, or habitat avoidance by larger mammals. Habitat which is temporarily lost for construction access and staging areas would be replanted after construction as described in **MMs VEG-1** and **VEG-2** in Chapter 3.3, Vegetation. These measures would avoid and minimize impacts to riparian vegetation and would require a Vegetation Monitoring and Management Plan for the project to restore vegetation. Protection and restoration of riparian vegetation would also protect and restore habitat for wildlife. Because construction hours would be limited to daytime (7:00 a.m. to 5:00 p.m. Monday through Friday) and buffers would be provided around nesting areas, noise disturbance to nesting birds, bats, and other wildlife would be limited. Woodrat nests would be completely avoided.

The potential for adverse effects to wildlife resources would be primarily limited to short-term effects during and immediately following construction/installation activities in the local area and immediately downstream.

Implementation of Mitigation Measure **MM BIO-1**, described in Chapter 3.2, Special Status Species, would limit disturbance of wildlife by avoiding work during winter and spring (October 15 through June 15) if listed fish are present. This restriction would also protect other aquatic wildlife in the creek during high flows, but would not protect fish present during the summer months. **MM BIO-4** would require training in avoidance of sensitive resources, including wildlife, for construction personnel on the site. **MM HYD-1** (described in Chapter 3.1, Soils and Water) would reduce the potential for water quality impacts from construction, reducing the potential for harm to fish and other aquatic wildlife in the Study Area. **MM BIO-5** would minimize impacts to small mammals, reptiles and nesting birds, roosting bats and bat maternity sites with pre-construction surveys and biological monitoring. These measures will also benefit non-special status wildlife species.

Cumulative Effects

A number of restoration and enhancement projects and a bridge replacement project have been recently completed, are ongoing, or are reasonably foreseeable in the vicinity of the Study Area. These include the Lagunitas Creek Winter Habitat and Floodplain Enhancement Project, MMWD stream enhancement within Samuel P. Taylor State Park, the recently completed restoration along Jewell Creek, ongoing Japanese knotweed (*Fallopia japonica*) eradication efforts, and the bridge replacement on Olema Creek. A full list of projects that may result in cumulative impacts see Chapter 2, Alternatives, Table 2-4. The timing of construction of these projects has the potential to increase temporary impacts on aquatic wildlife habitat by adding to sediment delivery, noise disturbance, and other impacts. However, because all reasonably foreseeable projects will be subject to avoidance, minimization and mitigation requirements for protection of special status species, any potential cumulative impacts on wildlife would be minor.

Conclusion

The restoration of the Lagunitas Creek channel and floodplain to more closely resemble its natural condition will improve habitat conditions for riparian wildlife species within the Study Area. The improved instream habitat and riparian corridor will provide fish and other aquatic wildlife with additional spawning and rearing habitat, improved water quality and streambank conditions resulting in a beneficial effect.

3.4.6 Impact Analysis Alternative B: No Action

Beneficial Effects

Under this alternative, no project actions would occur. Construction-related disturbances required foundation and debris removal and floodplain enhancements would be avoided, and temporary adverse impacts to wildlife from construction activity, including noise disturbance, potential for

special status species injury and mortality, and erosion and sediment delivery into the creek, would not occur.

Adverse Effects

Creek conditions and flow would remain the same as under current conditions. Current conditions include eroding banks, incised channels, and limited fish spawning habitat and amphibian breeding habitat. These conditions limit the potential for population recovery of salmonids, as well as for other fish and limit forage for species that prey on salmonids.

Cumulative Effects

There would be no contribution to cumulative impacts from the Proposed Project under this alternative, because project activities would not occur.

Conclusion

Without riparian enhancement activities, the current creek banks will continue to erode, causing loss of habitat, increasing input of fine sediment, and remaining footings and foundations to fall into the channel. Loss of shade from mature trees, fine sediment, and concrete rubble will reduce habitat for fish, amphibians, and riparian wildlife species.

References

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3.5 Cultural Resources

3.5.1 Introduction

This section addresses potential impacts or adverse effects on cultural resources that could result from implementation of the proposed project. Cultural resources include architectural resources, prehistoric and historic-period archaeological resources, and human remains. Cultural resources also include traditional cultural properties (TCPs), which include sites, features, places, cultural landscapes, sacred places, and objects with cultural value to a Native American tribe. Cultural resources—architectural, archaeological, or TCPs–that are considered significant according to the criteria set forth by the National Historic Preservation Act (NHPA) of 1966, as amended, are considered historic properties.

Area of Potential Effects

According to Section 106 the National Historic Preservation Act (NHPA) of 1966, as amended, the Area of Potential Effects (APE) is defined as:

> …the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking [36 CFR 800.16(d)].

The APE includes the areas, surface and subsurface, that could experience ground disturbance as a result of project activities. The APE is the NEPA Site Boundary as shown on Figure 1-2 in Chapter 1. Alternative A entails actions to expand and restore the channel and floodplain geomorphic, hydrologic, and ecological function at two sites (Sites 1 and 2) along Lagunitas Creek through removing fill and remnants of structures built in the riparian corridor, creating floodplain and riparian habitat, while protecting stream banks below Sir Francis Drake Boulevard. Alternative A would also enhance native vegetation and remove non-native vegetation at Site 3. The construction work area for Alternative A would encompass approximately 6.03 acres in total. Alternative A includes approximately 2.71 acres of grading that would impact approximately 1.51 acres of existing riparian and upland habitat. The Project includes removal of approximately 1.2 acres of former developed area, and restoration of 2.71 acres of transitional riparian and channel habitat

The vertical APE is the maximum depth of ground disturbance during project implementation. The maximum depth of excavation associated with creation of new floodplain areas would be no greater than 12 feet. Excavation related to the removal of walls and foundations would be no greater than 6 feet.

3.5.2 Regulatory Framework

Antiquities Act of 1906

The Antiquities Act (PL 59-209, 34 Stat. 225, 16 U.S.C. 432, and 43 CFR, Part 3) provides for the protection of historic or prehistoric remains, "or any antiquity," on federal lands. It protects historic monuments and ruins on public lands. It was augmented by the Archaeological Resources Protection Act (1979) as an alternative federal tool for prosecution of antiquities violations in the national park system.

National Historic Preservation Act of 1966, as amended

Effects of federal undertakings on historical and archaeological resources are considered through the National Historic Preservation Act (NHPA) of 1966, as amended (54 U.S.C. 306108), and its implementing regulations. Before an "undertaking" (e.g., federal funding or issuance of a federal permit) is implemented, Section 106 of the NHPA requires federal agencies to consider the effects of the undertaking on historic properties (i.e., properties listed in or eligible for listing in the National Register of Historic Places [National Register]) and to afford the Advisory Council on Historic Preservation a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing in the National Register. Under the NHPA, a property is considered significant if it meets the National Register listing criteria A through D, at 36 CFR 60.4, as follows:

> The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and that:
>
> a) Are associated with events that have made a significant contribution to the broad patterns of our history, or
>
> b) Are associated with the lives of persons significant in our past, or
>
> c) Embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction, or
>
> d) Have yielded, or may be likely to yield, information important in prehistory or history

For a resource to be eligible for the National Register, it must also retain enough integrity to be recognizable as a historical resource and to convey its significance. Resources that are less than 50 years old are generally not considered eligible for the National Register.

Federal review of the effects of undertakings on significant cultural resources is carried out under Section 106 of the NHPA and is often referred to as "Section 106 review". This process is the responsibility of the federal lead agency. The Section 106 review typically involves a four-step procedure, which is described in detail in the implementing regulations of the NHPA (36 CFR 800):

1. Define the Area of Potential Effects in which an undertaking could directly or indirectly affect historic properties.

2. Identify historic properties in consultation with the State Historic Preservation Officer (SHPO) and interested parties;

3. Assess the significance of effects of the undertaking on historic properties; and

4. Consult with the SHPO, other agencies, and interested parties to develop an agreement that addresses the treatment of historic properties and notify the Advisory Council on Historic Preservation and proceed with the project according to the conditions of the agreement.

American Indian Religious Freedom Act of 1978

The American Indian Religious Freedom Act (PL 95-341, 92 Stat. 469, 42 U.S.C. 1996) declares it official policy to protect and preserve the inherent and constitutional right of the Native American, Eskimo, Aleut, and Native Hawaiian people to believe, express, and exercise their traditional religions. The act provides that religious concerns should be accommodated or addressed under the National Environmental Policy Act or other appropriate statutes.

Archaeological Resources Protection Act of 1979

The Archaeological Resources Protection Act (PL 96-95, 93 Stat. 712, 16 U.S.C. 470aa et seq., and 43 CFR, Part 7, subparts A and B; 36 CFR) secures the protection of archaeological resources on public or Native American lands and fosters increased cooperation and exchange of information between private and government landholders and the professional community in order to facilitate the enforcement of resource protection and the education of present and future generations. The act regulates excavation and collection on public and Native American lands. Prior to issuance of a permit, it requires notification of Native American tribes who may consider a site of religious or cultural importance. The act was amended in 1988 to require the development of plans for surveying public lands for archaeological resources and systems for reporting incidents of suspected violations.

3.5.3 Affected Environment

Prehistoric Background

Categorizing the prehistoric period into cultural stages allows researchers to describe a broad range of archaeological resources with similar cultural patterns and components during a given timeframe, thereby creating a regional chronology. Milliken et al. (2007) provide a framework for the interpretation of the San Francisco Bay Area and have divided human history of the region into four broad periods: the *Paleoindian Period* (11,500 to 8000 B.C.), the *Early Period* (8000 to 500 B.C.), the *Middle Period* (500 B.C. to A.D. 1050), and the *Late Period* (A.D. 1050 to 1550). Economic patterns, stylistic aspects, and regional phases further subdivide cultural patterns into shorter phases. This scheme uses economic and technological types, socio-politics, trade networks, population density, and variations of artifact types to differentiate between cultural periods.

The *Paleoindian Period* (11,500 to 8000 B.C.) was characterized by big-game hunters occupying broad geographic areas. Evidence of human habitation during *Paleoindian Period* has not yet been discovered in the San Francisco Bay Area. During the *Early Period* (*Lower Archaic*; 8000 to 3500 B.C.), geographic mobility continued from the *Paleoindian Period* and is characterized by the millingslab and handstone as well as large wide-stemmed and leaf-shaped projectile points. The first cut shell beads and the mortar and pestle are documented in burials during the *Early Period* (3500 to 500 B.C.), indicating the beginning of a shift to sedentism. During the *Middle Period*, which includes the *Lower Middle Period* (500 B.C. to A.D. 430), and *Upper Middle Period* (A.D. 430 to 1050), geographic mobility may have continued, although groups began to establish longer-term base camps in localities from which a more diverse range of resources could be exploited. The first rich midden sites are recorded from this period. The addition of milling tools, obsidian and chert concave-base projectile points, and the occurrence of sites in a wider range of environments suggest that the economic base was more diverse. By the *Upper Middle Period*, highly mobile hunter-gatherers were increasingly settling down into numerous small villages. Around A.D. 430 a dramatic cultural disruption occurred evidenced by the sudden collapse of the *Olivella* saucer bead trade network. During the *Initial Late Period* (A.D. 1050 to 1550), social complexity developed toward lifeways of large, central villages with resident political leaders and specialized activity sites. Artifacts associated with the period include the bow and arrow, small corner-notched projectile points, and a diversity of beads and ornaments.

Ethnographic Background

The proposed project is located within the ethnographic territory of the Coast Miwok (Barrett, 1908; Kelly, 1978; Kroeber, 1925). The Coast Miwok language, a member of the Miwok subfamily of the Penutian family, is divided into two dialects: Western (or Bodega) and Southern (or Marin) which in turn is subdivided into valley and coast. *Miwok* refers to the entire language family that was spoken by Coast Miwok, as well as Lake, Valley, and Sierra Miwok. Coast Miwok territory encompassed all of present-day Marin County and parts of Sonoma County, from Duncan's Point on the coast to between the Sonoma and Napa rivers. Each large village had a tribal leader, but there does not appear to have been any defined broader-scale organization (Kelly, 1978:414).

Much of the information about post-contact Coast Miwok material culture and lifestyles was gathered from two informants, Tom Smith (Bodega dialect) and María Copa (Marin dialect) (based on Kelly's field notes from 1931 to 1932). Settlements focused on bays and estuaries, or along perennial interior watercourses. The economy was based on fishing, hunting, and gathering, and revolved around a seasonal cycle during which people traveled throughout their territory to make use of resources as they became available. Marine foods, including kelp, clams, crabs, and especially fish, were a year-round staple. Acorns were gathered in season and stored for use throughout the year. Tobacco was generously used by most men.

By the mid-1800s Spanish missionization, diseases, raids by Mexican slave traders, and dense immigrant settlement had disrupted Coast Miwok culture, dramatically reducing the population and displacing the native people from their villages and land-based resources. By the time of California's initial integration into the United States in the late 1840s, the Coast Miwok

population had dwindled from approximately 2,000 individuals to one-eighth of its size before European contact (Kelly, 1978:414).

In 1920, the Bureau of Indian Affairs purchased a 15.45-acre tract of land in Graton for the Marshall, Bodega, Tomales, and Sebastopol Indians. This land was put into a federal trust and these neighboring peoples that included both Coast Miwok and Southern Pomo were consolidated into one recognized group: the Graton Rancheria. In 1958 the U.S. government enacted the Rancheria Act of 1958, transferring tribal property into private ownership. Forty-four Rancherias in California were affected, including the Graton Rancheria.

Since then, tribal members have continued to protect their cultural heritage and identity despite being essentially landless. On December 27, 2000 President Clinton signed into law legislation restoring federal recognition to the Federated Indians of Graton Rancheria. The tribe currently has approximately 1,100 members. The tribe employs a Tribal Historic Preservation Officer[1] and is engaged in the protection and interpretation of their tribal cultural resources.

Historic Background

The name Marin County is purportedly derived from a famous *Lacatuit* Chief, whose people originally occupied this northern San Francisco Bay territory (Goerke, 2007). Following the alleged arrival of Sir Francis Drake, Sebastian Rodriguez Cermeño anchored off the Coast of Marin County in 1595. A Portuguese explorer sailing for Spain, Cermeño was ordered to explore more of the coast of California and it was during this trip that his ship, the *San Agustín*, was shipwrecked at Drakes Bay. Using a prefabricated launch brought along for coastal exploration, Cermeño and his crew completed a modest exploration of the Marin County area. Permanent Hispanic settlement in Marin County was eventually achieved in 1817 when the Mission San Rafael was established by Padres Amaroso and Cijos (Hoover et al., 2002).

During the Mexican Period, the land within Marin County was divided into several ranchos. The project area was within the Rancho Nicasio, which was sold to Gaudenzio Cheda and Carlo Solari in 1966. By 1970, Cheda had established a thriving dairy ranch. In the mid-1970s, he began leasing the lands and dairy operation to various tenants and when he died in 1883 he left the ranch to his heirs. In 1930, the project area was divided from the real estate holdings of the Cheda Estate Corporation into 108 lots that were to be sold for individual development as recreation homes. The lots were sold and developed with summer homes between 1930 and 1956. The NPS acquired most of these properties in the early 1980s, leasing the parcels back to local residents until the Reservations of Use expired in the early 2000s (Engel, 2015).

[1] Section 101(d)(2) of the NHPA allows tribes to assume any or all of the functions of a State Historic Preservation Officer (SHPO) with respect to tribal land.

3.5.4 Methodology

In order to determine whether significant cultural resources would be impacted by the proposed project, the National Park Service (NPS) archaeologist and an Environmental Science Associates (ESA) archaeologist conducted a cultural resources assessment that included background research, a surface survey, recordation and evaluation of architectural resources, and consultation with the local Native American tribe. In summary, the results of the investigation indicated that there are no historic properties (i.e. cultural resources eligible for listing in the National Register) in the APE and that the finding of effect for the purposes of Section 106 of the NHPA would be that of *No Historic Properties Affected*.

Archival Research

In order to establish a background context for the project APE, research was conducted to determine whether cultural resources had been previously recorded within the APE and to assess the likelihood of unrecorded cultural resources. The Point Reyes National Seashore Cultural Resources Geographic Information System (CRGIS) database maintains information about the types and locations of cultural resources that have been identified within the park and previous investigations that have been conducted. NPS staff consulted the CRGIS as well as historic resource studies, historic maps, and other archival materials. In addition, ESA staff conducted a records search at the Northwest Information Center (NWIC) of the California Historical Resources Information System at Sonoma State University on March 23, 2017 (File No. 16-1447).

The review of the CRGIS and the NWIC indicated that the APE is within the greater boundaries of the Olema Valley Dairy Ranches Historic District. The District includes 19 ranches determined to be locally significant under National Register criterion a and c, with a period of significance from 1856 to 1961. A total of 158 buildings, sites, and structures are contributing resources of the District. Landscape features and historic-period archaeological sites are also located with the District's boundaries (Livingston, 1995). The APE is within the Cheda Ranch portion of the District; however, no contributing resources to the District occur within the APE.

The background research identified two previously conducted identification studies that included a survey and evaluation of eight summer homes in the Tocaloma portion of the APE. The Tocaloma Recreation Homes were part of the Paper Mill Arroyo Subdivision that comprised 108 lots divided from the real estate holdings of the Cheda Ranch Corporation in 1930. In 2001, the Tocaloma Recreation Homes were evaluated as a potential historic district. The NPS determined that the Tocaloma Recreation Homes were not eligible for listing in the National Register as a historic district (NPS, n.d.). The NPS also determined that with the exception of the Franchini residence at 9255 Sir Francis Drake Boulevard, none of the buildings or associated features were individually eligible for listing in the National Register. The SHPO concurred with the determination of ineligibility (Engel, 2015:6).

Survey and Evaluation Efforts

In 2010, the NPS surveyed and evaluated five summer homes in the Jewell portion of the APE, also part of the Paper Mill Arroyo Subdivision. The NPS determined that the Jewell Recreation

Homes were not eligible for listing in the National Register as a historic district, nor were any of the buildings or associated features individually eligible for listing in the National Register (Engel, 2015). On May 29, 2015, the NPS recommended to the SHPO a finding of *No Historic Properties Affected* for the removal of the structures at Tocaloma and Jewell. The SHPO concurred with the finding on July 1, 2015.

An NPS archaeologist and an ESA archaeologist also conducted an intensive pedestrian survey for archaeological resources. The surveys covered the entire 6.3-acre APE. Transects were spaced no greater than 10 meters apart and surface scrapes were conducted in areas where vegetation obscured visibility of the ground surface. All buildings and structures in the Jewell portion of the APE (Site 2) and most of the buildings and structures in the Tocaloma portion of the APE (Sites 1 and 3) had been removed. Large piles of rubble and foundation remains were evident throughout the APE. No prehistoric resources, such as midden soil, shell, lithic tools or fragments, or faunal remains, were identified in the APE during the surface survey.

Native American Consultation

Consultation on the proposed project was completed between the NPS and the federally-recognized Native American tribe-the Federated Indians of Graton Rancheria (FIGR). On June 4, 2015, the FIGR concurred with the NPS finding that cultural resources of the Tribe would not be adversely impacted by the proposed project. The State Coastal Conservancy sent a letter to the FIGR providing an opportunity for consultation on October 11, 2016. No response was received from the FIGR.

3.5.5 Impact Analysis Alternative A: Action Alternative

Beneficial Effects

The project is not designed to specifically focus on, restore, or otherwise benefit cultural resources.

Adverse Effects

As described in the Methodology section above, the survey and evaluation indicate that there are no architectural resources in the APE that qualify as historic properties. In addition, background research and the surface survey did not identify archaeological resources or TCPs in the APE. As such, the proposed project does not have the potential to adversely affect known significant cultural resources (i.e. historic properties).

While unlikely, there is the potential to uncover previously unknown archaeological resources or human remains during ground-disturbing activity associated with the project. If previously unknown resources are discovered and identified during ground-disturbing activity, it could lead to adverse effects, which could be potentially significant. **MM CUL-1** and **MM CUL-2**, which include requirements for contractors to cease work if any potential resources are encountered, would reduce impacts or adverse effects to previously unidentified cultural resources.

Cumulative Effects

In general, the proposed actions would contribute very little to overall park trends in cultural resource integrity. The other projects described in Chapter 2, *Alternatives*, Table 2-4, do not involve adverse effects to significant cultural resources, and mitigation proposed for this and other projects would protect the previously unknown resources in the project area from adverse effects.

Conclusion

The survey and evaluation of cultural resources did not document the presence of historic properties, including archaeological resources or TCPs, in the APE. While unlikely, there is the potential for the proposed project to encounter previously unidentified archaeological resources and/or human remains. However, implementation of Mitigation Measures **MM CUL-1** and **MM CUL-2** would reduce potential adverse effects by ensuring that the appropriate actions are taken in the event of an inadvertent discovery of archaeological resources and/or human remains.

3.5.6 Impact Analysis Alternative B: No Action Alternative

Under the No Action Alternative, there would be no activities on site and as such there would be no construction-related or cumulative impacts to cultural resources.

3.5.7 Mitigation Measures

MM CUL-1 In the event of any discovery of human remains, archaeological deposits, or any other type of cultural resource during construction, work shall stop work and the National Park Service archaeological staff shall be notified within 24 hours. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include refuse-filled privies or wells. Construction work shall be suspended immediately and shall not resume until the National Park Service re-authorizes project construction. If it is determined that the discovery is eligible for listing in the National Register, and cannot be avoided, the National Park Service will follow the procedures for Post Review Discoveries 36 CFR 800.13. If human remains are discovered, SPAWN shall implement measure MM CUL-2.

MM CUL-2 In the event of discovery or recognition of any human remains during construction activities, such activities within 100 feet of the find shall cease until the Marin County Coroner has been contacted to determine that no investigation of the cause of death is required. The NPS will be notified in the event of the discovery of human remains. The NPS will follow the procedures for the inadvertent discovery of human remains outlined in 43 CFR 10.4 in compliance with the Native American Graves Protection and Repatriation Act.

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3.6 Hazardous Materials

3.6.1 Introduction

The term "hazardous materials" refers to both hazardous substances and hazardous wastes. Under federal and state laws, any material, including wastes, may be considered hazardous if it is specifically listed by statute as such or if it is toxic (causes adverse human health effects), ignitable (has the ability to burn), corrosive (causes severe burns or damage to materials), or reactive (causes explosions or generates toxic gases).

This section identifies potential hazards and hazardous materials within the project area and those associated with the project's construction methodology. Where applicable, mitigation measures are recommended to minimize the potential for adverse effects as a result of encountering hazards or hazardous materials in the project vicinity or from project construction.

3.6.2 Regulatory Framework

The primary federal agencies with responsibility for hazardous materials management include the U.S. Environmental Protection Agency (USEPA), U.S. Department of Labor Occupational Safety and Health Administration (Fed/OSHA), and the U.S. Department of Transportation (DOT). Federal laws, regulations, and responsible agencies are summarized in **Table 3.6-1**. Titles 10, 29, 40, and 49 of the Code of Federal Regulations (CFR) contain the primary applicable federal regulations relating to hazardous materials.

3.6.3 Affected Environment

The project sites are not listed on any of the available online databases of hazardous materials sites maintained by the State Water Resources Control Board (SWRCB, 2017) and the Department of Toxic Substances Control (DTSC, 2017) compiled pursuant to Government Code Section 65962. The project includes the demolition of remnants of residential structures. Residual lead-based paints (LBP) and asbestos containing materials (ACM) may have contaminated the soil and groundwater in the project area.

A Hazardous Material Survey was conducted in the project area for all three proposed sites in 2015, which identified lead paint from on-site buildings (ACC Environmental Consultants, Inc., 2015). All above-ground structures and other hazardous materials (septic systems and fuel storage tanks) at Sites 1 and 2 were demolished and removed by the NPS in 2016. After removal of the above-ground structures at Sites 1 and 2, the area was regraded and the soil was mixed and disturbed. The soil has not been tested since the structures were removed from Sites 1 and 2 and there is a potential to encounter residual hazardous materials, such as lead or petroleum hydrocarbons, due to past contamination of the soil or groundwater during project construction. Any hazardous materials encountered in excavated soil or groundwater during project construction could result in a release to the environment, which could potentially expose construction workers and the public to hazardous materials.

TABLE 3.6-1
FEDERAL LAWS AND REGULATIONS RELATED TO HAZARDOUS MATERIALS MANAGEMENT

Classification	Law or Responsible Federal Agency	Description
Hazardous Materials Management	Community Right-to-Know Act of 1986 (also known as Title III of the Superfund Amendments and Reauthorization Act (SARA)	Imposes requirements to ensure that hazardous materials are properly handled, used, stored, and disposed of and to prevent or mitigate injury to human health or the environment in the event that such materials are accidentally released.
Hazardous Waste Handling	Resource Conservation and Recovery Act of 1976 (RCRA)	Under RCRA, the USEPA regulates the generation, transportation, treatment, storage, and disposal of hazardous waste from "cradle to grave."
	Hazardous and Solid Waste Act	Amended RCRA in 1984, affirming and extending the "cradle to grave" system of regulating hazardous wastes. The amendments specifically prohibit the use of certain techniques for the disposal of some hazardous wastes.
Hazardous Materials Transportation	U.S. Department of Transportation (DOT)	DOT has the regulatory responsibility for the safe transportation of hazardous materials. The DOT regulations govern all means of transportation except packages shipped by mail (49 CFR).
	U.S. Postal Service (USPS)	USPS regulations govern the transportation of hazardous materials shipped by mail.
Occupational Safety	Occupational Safety and Health Act of 1970	Fed/OSHA sets standards for safe workplaces and work practices, including the reporting of accidents and occupational injuries (29 CFR).
Structural and Building Components (Lead-based paint, polychlorinated biphenyls, and asbestos)	Toxic Substances Control Act	Regulates the use and management of polychlorinated biphenyls in electrical equipment, and sets forth detailed safeguards to be followed during the disposal of such items.
	USEPA	The USEPA monitors and regulates hazardous materials used in structural and building components and their effects on human health.

SOURCE: ESA, 2016, Sacramento Railyards Specific Plan Update, KP Medical Center, MLS Stadium, & Stormwater Outfall, Draft Subsequent Environmental Impact Report, June

The California Department of Forestry and Fire Protection (CAL FIRE) has created a severity system to rank fire hazards and examine wildland fire potential across the state. These zones found on CAL FIRE maps account for the speed and intensity of potential fires, abilities of embers to spread and multiply, loading of fuel, topographic conditions, and local climate (e.g. temperature and likelihood of strong winds). In total, there are three CAL FIRE designations for fire hazards, which are moderate, high, and very high. Typically, homes that are located within high or very high CAL FIRE zones are considered lacking in adequate wildland or structural fire protection. The project area is not within a Moderate, High or Very High Fire Hazard Severity Zone (CAL FIRE, 2007; CAL FIRE, 2008). However, Site 2 is adjacent to a moderate and high severity zone (CAL FIRE, 2007). Furthermore, the project aims to enhance riparian habitat and also runs within a wildland area. Construction activities would occur adjacent or in the riparian corridor and wildland area, in areas covered with grasses and vegetation that would be susceptible to fire. Potential sources of ignition could include equipment with internal combustion engines and gasoline-powered tools as well as smoking by onsite construction personnel.

3.6.4 Methodology

Particular consideration was given to existing or potentially existing hazardous materials in the project area as well as to hazards and hazardous materials associated with construction techniques.

3.6.5 Impact Analysis Alternative A: Action Alternative

The Action Alternative (Alternative A) involves ground disturbance and excavation of up to 12 feet deep during which contamination could be encountered. Demolition and removal of structural remnants at Sites 1 and 2 and vegetative maintenance at all three sites, as described in Chapter 2, Alternatives would also occur.

Beneficial Effects

Alternative A would allow for the removal of soil that may potentially contain residual LBP and ACM from the project site. Removal of hazardous materials would be an environmental and human health benefit.

Adverse Effects

Alternative A could result in an accidental encounter or release of hazardous materials into the environment that could expose workers or the public.

Cumulative Effects

Cumulative effects as a result of hazardous materials could occur if nearby projects involved the use or had the potential to encounter existing hazardous materials and did not adhere to applicable laws and regulations at the federal, state, and local levels that would prevent the exposure of individuals and the environment to the hazards materials.

Conclusion

Alternative A would involve the use of hazardous materials during construction and could result in the exposure to existing hazardous materials that could impact workers and the environment. However, the project would also involve the removal of contaminated environmental media that may contain LBP and ACM per applicable laws which would serve as a benefit of the project. With the implementation of the mitigation measures listed below, adverse effects would be reduced.

3.6.6 Alternative B: No Action Alternative

Under the No Action Alternative (Alternative B) no direct action would occur as a result of the project.

Beneficial Effects

Under this alternative, hazardous materials would not be used as a result of construction or encountered during ground disturbance.

Adverse Effects

Environmental media potentially containing LBP or ACM would not be removed and disposed of per applicable laws.

Cumulative Effects

Alternative B could have a cumulative impact if other projects in the immediate vicinity also do not remove contaminated environmental media that may contain LBP and ACM from the project area.

Conclusion

The potential for exposure to hazardous materials could impact workers or the environment would be avoided under Alternative B. However, potentially contaminated environmental media that would have been removed would remain in the project area.

3.6.7 Mitigation Measures

The following mitigation measures are designed to reduce potential project impacts as a result of hazardous materials to less than significant levels.

MM HAZ-1a **Pre-Construction Hazardous Materials Assessment.** Prior to construction, the project sponsor shall ensure that a limited soil and/or groundwater investigation is performed at proposed construction work area to characterize soil and/or groundwater quality. The project sponsor shall conduct a site assessment (the "Pre-Construction Hazardous Materials Assessment") including potential testing of soil and/or groundwater, and if testing reveals soil and/or groundwater concentrations that exceed applicable regulatory levels, the project sponsor shall contact the County of Marin or Regional Water Quality Control Board (RWQCB), as appropriate, to secure regulatory oversight and the NPS Senior Environmental Planner shall be notified.

The Pre-Construction Hazardous Materials Assessment may include the following: analysis of subsurface soil samples within the project site for total petroleum hydrocarbons (as gasoline, diesel, and waste oil), Title 22 metals, and volatile organic compounds (VOCs) or any other chemicals of concern to evaluate the potential presence of contamination; and groundwater samples if subsurface excavations are anticipated to require dewatering. In the case of LBP, the identification, removal, and disposal is regulated under Section 8 California Code of Regulations (CCR) 1532.1.

The results of the Pre-Construction Hazardous Materials Assessment shall be incorporated into the Site Health and Safety Plan prepared in accordance with Mitigation Measure HAZ-1b and the Soil and Groundwater Management Plan prepared in accordance with Mitigation Measure HAZ-1c to determine whether: specific soil and groundwater management and disposal procedures for contaminated materials are required; excavated soils are suitable for reuse; and construction worker health and safety procedures for working with contaminated materials are required. If the pre-construction hazardous materials assessment

identifies the presence of soil and/or groundwater contamination at concentrations in excess of applicable regulatory screening levels (Environmental Screening Levels [ESLs] or California human health screening levels [CHHSLs]) for proposed site use, the project sponsor or its contractor shall complete site assessment and remedial activities required by the regulatory agency to ensure that residual soil and/or groundwater contamination, if any, shall not pose a continuing significant threat to groundwater resources, human health, or the environment. A copy of the pre-construction hazardous materials assessment shall be submitted to the NPS Senior Environmental Planner for approval.

MM HAZ-1b **Health and Safety Plan.** SPAWN shall retain a qualified environmental professional to prepare a site-specific Health and Safety Plan (HASP) in accordance with federal OSHA regulations (29 CFR 1910.120) and Cal/OSHA regulations (8 CCR Title 8, Section 5192). SPAWN shall require the contractor to comply with the HASP. Because anticipated contaminants vary depending upon the location of proposed improvements in the project area and may vary over time, the HASP shall address site-specific worker health and safety issues during construction. The HASP shall include the following information:

a. Results of sampling conducted in accordance with Mitigation Measure HAZ-1a.

b. All required measures to protect construction workers and the general public by including engineering controls, monitoring, and security measures to prevent unauthorized entry to the construction areas and to reduce hazards outside of the construction areas. If prescribed contaminant exposure levels are exceeded, personal protective equipment shall be required for workers in accordance with state and federal regulations.

c. Required worker health and safety provisions for all workers potentially exposed to contaminated materials, in accordance with state and federal worker safety regulations, and designated qualified individual personnel responsible for implementation of the HASP.

SPAWN shall require the contractor to have a site health and safety supervisor fully trained pursuant to hazardous materials regulations be present during excavation, trenching, or cut and fill operations to monitor for evidence of potential soil contamination, including soil staining, noxious odors, debris or buried storage containers. The site health and safety supervisor must be capable of evaluating whether hazardous materials encountered constitute an incidental release of a hazardous substance or an emergency spill. The site health and safety supervisor shall implement procedures to be followed in the event of an unanticipated hazardous materials release that may impact health and safety. These procedures shall be in accordance with hazardous waste operations and regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of the unknown hazardous materials release; notifying the County of Marin and retaining a qualified environmental firm to perform sampling, remediation, and/or disposal.

SPAWN shall provide documentation that HASP measures have been implemented during construction.

Submittal of the HASP to the NPS, or any review of the contractor's HASP by NPS, shall not be construed as approval of the adequacy of the contractor as a health and safety professional, the contractor's HASP, or any safety measure taken in or near the construction site. The contractor shall be solely and fully responsible for compliance with all laws, rules, and regulations applicable to health and safety during the performance of the construction work.

A copy of the HASP shall be submitted to the NPS Senior Environmental Planner for approval.

MM HAZ-1c **Soil and Groundwater Management Plan.** If ground-borne hazardous materials are identified under the Pre-Construction Hazardous Materials Assessment, prepared in accordance with Mitigation Measure HAZ-1a, SPAWN shall require the construction contractor to prepare and implement a Soil and Groundwater Management Plan, subject to review by the NPS Senior Environmental Planner, that specifies the method for handling and disposal of contaminated soil and groundwater prior to construction. The plan shall include all necessary procedures to ensure that excavated materials and fluids generated during construction are stored, managed, and disposed of in a manner that is protective of human health and in accordance with applicable laws and regulations. The plan shall include the following information:

a. Step-by-step procedures for evaluation, handling, stockpiling, storage, testing, and disposal of excavated material, including criteria for reuse and offsite disposal. All excavated materials shall be inspected prior to initial stockpiling, and spoils that are visibly stained and/or have a noticeable odor shall be stockpiled separately to minimize the amount of material that may require special handling. In addition, excavated materials shall be inspected for buried building materials, debris, and evidence of underground storage tanks; if identified, these materials shall be stockpiled separately and characterized in accordance with landfill disposal requirements. If some of the spoils do not meet the reuse criteria and/or debris is identified, these materials shall be disposed of at a permitted landfill facility.

b. Procedures to be implemented if unknown subsurface conditions or contamination are encountered, such as previously unreported tanks, wells, or contaminated soils.

c. Procedures for containment, handling and disposal of groundwater generated from construction activities, the method to be used to analyze groundwater for hazardous materials likely to be encountered and the appropriate treatment and/or disposal methods.

MM HAZ-2 SPAWN shall identify underground utility lines such as natural gas, electricity, and water lines that may be encountered during excavation work. Information regarding the size, type, and location of existing utilities will be confirmed by the utility service provider. If such underground utility lines are identified, a plan that outlines construction methods and protective measures to minimize impacts on aboveground and belowground utilities shall be prepared. Construction shall be scheduled to minimize or avoid interruption of utility services to customers. Disconnected utility lines shall be promptly reconnected.

MM HAZ-3 The project sponsor shall ensure that the following fire safety construction practices are implemented:

a. Earthmoving and portable equipment with internal combustion engines shall be equipped with a sparks arrestor to reduce the potential for igniting a wildland fire;

b. Appropriate fire suppression equipment shall be maintained at the construction site;

c. Flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame; and

d. Construction personnel shall be trained in fire safe work practices, use of fire suppression equipment, and procedures to follow in the event of a fire.

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3.7 Transportation

3.7.1 Introduction

This section describes existing transportation conditions within the project area, including vehicular traffic, transit service, and bicycle and pedestrian use. This section evaluates the proposed project's effect on transportation along Sir Francis Drake Boulevard.

3.7.2 Regulatory Framework

The County of Marin holds primary responsibility for maintaining roads in the unincorporated areas of the County. Work within, or use of, county-maintained roads such as Sir Francis Drake Boulevard, requires an encroachment permit from the County and a construction traffic control plan.

The Transportation Authority of Marin (TAM) is the county congestion management agency, and oversees the Marin Congestion Management Program network (e.g., Sir Francis Drake Boulevard). TAM monitors long-term traffic conditions related to future development.

3.7.3 Affected Environment

Key Access Roadways

Regional access for the project sites would be provided by U.S. Highway 101, and local access for construction-related activities would occur through Sir Francis Drake Boulevard.

Sir Francis Drake Boulevard is an arterial road that runs east-west, connecting Highway 101 to State Route (SR) 1. Sir Francis Drake Boulevard serves as a main route to and from many communities west of SR 1 in Marin County, and in the vicinity of the proposed project, it is a rural two-lane road, which often experiences higher traffic volumes on weekends than on weekdays. Transit service is provided by West Marin Stagecoach Route 68 every one to two hours. There are no bicycle or pedestrian facilities (bike lanes or sidewalks) along Sir Francis Drake Boulevard in the project area.

3.7.4 Methodology

There would be no new long-term trips associated with the proposed project, as increased vehicle trips generated by the proposed project would cease when construction is complete. The duration of any adverse effects related to short-term disruption of traffic flow and increased congestion generated by construction vehicles would be limited to the period of time needed to complete construction of the project components. Therefore, the analysis presented herein is focused on the short-term project construction effects.

3.7.5 Impact Analysis Alternative A: Action Alternative

Project Characteristics

The level of project-generated truck traffic would vary depending on the nature of the construction activity. Using conservative assumptions that (1) there would be no reuse of excavated soil at Sites 1 and 2, (2) off-hauling of excavated soil from Sites 1 and 2 would each occur over a four-week period, and (3) there would be days when trucks would haul excavated soil from both Sites 1 and 2, the 10-cubic-yard haul trucks would generate up to approximately 142 one-way truck trips per day (i.e., one truck trip every three minutes, spread over the course of an eight-hour day).[1]

Construction crew sizes likewise would vary depending on the construction activity, but would peak at up to 10 workers per day, generating up to approximately 26 one-way vehicle trips per day (20 commute trips plus 6 midday trips [e.g., for lunch]). The great majority of worker trips (commute trips) would not occur at the same time as the above-described truck trips.

The level of service standards for roadways that are part of the Marin Congestion Management Program network (e.g., Sir Francis Drake Boulevard) are intended to monitor and address long-term traffic conditions related to future development that generate permanent (on-going) traffic increases, and do not apply to temporary impacts associated with construction projects. Potential impacts associated with the proposed project would be limited to construction activity, which would be transitory in nature, and effects on roadway operations would be temporary. Specifically, increased vehicle trips generated by the proposed project would cease when construction is complete. As such, the proposed project would not exceed level of service standards established by the Transportation Authority of Marin (the county congestion management agency) for designated Congestion Management Program roadways.

The proposed project would not alter the physical configuration of Sir Francis Drake Boulevard, and would not introduce unsafe design features.

Beneficial Effects

The Action Alternative would not result in any beneficial effects to transportation.

Adverse Effects

Construction-generated traffic increases would be temporary, and therefore, would not result in any long-term degradation in operating conditions on roads used for the project. The primary effect of construction-related traffic would be a temporary and intermittent lessening of the capacities of Sir Francis Drake Boulevard because of the slower movements of construction trucks compared to passenger vehicles. Drivers could experience delay if they were traveling behind a heavy truck. The sequencing of earthwork between Site 1 and Site 2 would be expected

[1] Using the same conservative assumptions about no-reuse of excavated soil and the four-week period of off-hauling, the 10-CY trucks would generate an average of about 98 and 44 one-way truck trips per day from Site 1 and Site 2, respectively. Those trips would result in one truck trip every five and ten minutes, respectively, over an eight-hour work day.

to overlap, though not necessarily over the entire four-week period. With implementation of mitigation measure **MM TRAF-1**, potential adverse effects to traffic flow on area roadways would be minimized.

Cumulative Effects

The geographic scope of potential cumulative traffic impacts includes access routes to area roadways used for haul routes and construction equipment/vehicle access to the construction sites. Cumulative effects on transportation facilities/conditions could occur as a result of cumulative projects that generate increased traffic at the same time on the same roads as would the project, causing increased congestion and delays. A review of planned projects in the geographic scope Chapter 2, *Alternatives* (Table 2-4) indicate projects that could generate construction-related traffic impacts at the time that the project would be under construction. Implementation of traffic control strategies (as identified in **MM TRAF-1**) would minimize the project's contribution to cumulative impacts.

Conclusion

There would be no new long-term trips associated with the proposed project, as increased vehicle trips generated by the project would cease when construction is complete. Alternative A would generate traffic increases (by trucks and workers) during construction and could result in temporary and intermittent congestion and delays (e.g., if a driver were traveling behind a heavy truck). With the implementation of the mitigation measure listed below, adverse effects would be minimized.

3.7.6 Alternative B: No Action Alternative

Under this alternative no direct action would occur as a result of the project; therefore, transportation would not be affected. Adverse effects such as temporary construction-generated traffic increases resulting from the implementation of the Action Alternative would not occur under the No Action Alternative. The No Action Alternative would have no effect in combination with cumulative impacts in the project area.

3.7.7 Mitigation Measures

MM TRAF-1 SPAWN shall require the construction contractor(s) to hire a qualified traffic engineer to prepare a traffic control plan (TCP) for Sites 1, 2, and 3, in accordance with professional engineering standards, and submit the TCP to the County of Marin Public Works Department for review and approval. The TCP shall be developed on the basis of detailed design plans for the approved project, and shall include, but not necessarily be limited to, the elements listed below:

a. Schedule grading and excavation activity at Sites 1 and 2 to minimize the overlap of haul truck trips from both sites;

b. Schedule construction activities to minimize traffic impacts during heavy recreational use periods (e.g., weekends and holidays);

c. To the extent feasible, reduce truck trips during the peak morning and evening commute hours to minimize adverse impacts on traffic flow;

d. Store all equipment and materials in designated contractor staging areas;

e. Comply with roadside safety protocols to reduce the risk of collisions. Provide "Trucks Entering Roadway" warning signs in advance of project work sites. Train construction personnel to apply appropriate safety measures as described in the traffic control plan.

CHAPTER 4
Initial Study/Mitigated Negative Declaration

4.1 Environmental Checklist

1. **Project Title:** Lagunitas Creek Floodplain and Riparian Restoration Project
2. **Lead Agency Name and Address:** California State Coastal Conservancy
3. **Contact Person and Phone Number:** Joel Gerwein 510-286-4170
4. **Project Location:** Tocaloma, Marin County; 32-acre area bounded by Sir Francis Drake Boulevard and Lagunitas Creek in Point Reyes National Seashore
5. **Project Sponsor's Name and Address:** Preston Brown, Project Manager Salmon Protection and Watershed Network (SPAWN) PO Box 370, Forest Knolls, CA 94933
6. **General Plan Designation(s):** National Park
7. **Zoning:** Public Parklands
8. **Description of Project:** Refer to Chapter 2
9. **Surrounding Land Uses and Setting:** National Park
10. **Other public agencies whose approval is required:** U.S. Department of Interior, National Park Service (NPS); U.S. Army Corps of Engineers; U.S. Fish and Wildlife Service; National Marine Fisheries Service; San Francisco Bay Regional Water Quality Control Board; California Department of Fish and Wildlife; and Marin County.
11. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, has consultation begun?**

Consultation on the proposed project was completed between the NPS and the federally-recognized Native American tribe-the Federated Indians of Graton Rancheria (FIGR). On June 4, 2015, the FIGR concurred with the NPS finding that cultural resources of the Tribe would not be adversely impacted by the proposed project. The State Coastal Conservancy sent a letter to the FIGR providing an opportunity for consultation on October 11, 2016. No response was received from the FIGR.

4.2 Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐ Aesthetics	☐ Agriculture and Forestry Resources	☒ Air Quality
☒ Biological Resources	☒ Cultural Resources	☐ Geology/Soils
☐ Greenhouse Gas Emissions	☒ Hazards & Hazardous Materials	☒ Hydrology/Water Quality
☐ Land Use/Planning	☐ Mineral Resources	☐ Noise
☐ Population/Housing	☐ Public Services	☐ Recreation
☒ Transportation/Traffic	☒ Tribal Cultural Resources	☐ Utilities/Service Systems
		☒ Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)
On the basis of this initial study:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☒ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature _____ Date 1/19/18

Signature _____ Date _____

4.3 Environmental Checklist

4.3.1 Aesthetics

	Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
1.	**AESTHETICS — Would the project:**				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☒	☐
c)	Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d)	Create a new source of substantial light or glare which would adversely affect daytime or nighttime views in the area?	☐	☐	☐	☒

Discussion

a) **No Impact**. Lagunitas Creek is located in western Marin County and flows for approximately 22 miles from its headwaters on Mount Tamalpais to its mouth at the southern tip of Tomales Bay. Riparian features characterize the immediate project setting. Uplands surrounding Lagunitas Creek consist of park lands that are within the Golden Gate National Recreation Area. Existing land uses and features in the surrounding area include the Samuel P. Taylor State Park and Point Reyes National Seashore. The project would restore habitat for salmon and enhance the floodplain. No permanent infrastructure would be added to the site and therefore no impact would occur on any scenic vistas.

b, c) **Less than Significant Impact**. Potential visual impacts to the site and its surroundings would be associated primarily with construction. These temporary impacts would be due to the presence of construction equipment and staging areas. Construction activities would potentially be visible from Sir Francis Drake Boulevard. This impact would be temporary, lasting approximately four months and would not substantially degrade the existing visual character or quality of the site and its surroundings. With the project completion there would be a visual improvement at Sites 1 and 2 from the removal of remnants of former residential structures including foundations, retaining walls and bulkheads, concrete and other debris. No historic buildings would be removed at Site 3 (see the Cultural Resources section). The enhanced floodplain and revegetation as well as invasive removal would also result in a beneficial impact to the visual character of a restored natural setting. Therefore, implementation of the project would have a less-than-significant impact on the existing visual character of the site and its surroundings.

As described in Section 15, *Recreation*, there are publicly accessible recreational trails within the project vicinity, but none are visible from the project sites. The nearest recreational trail (Cross Marin Trail) is approximately 250 feet south of the project site and on the south side of Lagunitas Creek. The Jewell Trail is approximately 2,500 feet

south of Site 2. The project site may be visible from long-range views from the trails for recreation. Marin County has no officially designated scenic routes in the region: Highway 1 is an eligible state scenic highway, however, the project area is not visible from this route. Therefore, the project would have a less-than significant impact on scenic resources.

d) **No Impact**. The project would not introduce a new source of substantial light or glare to the area. Night-time construction is not anticipated; therefore, construction activities would not require the use of lights. Project construction would not include use of equipment or material that would introduce sources of substantial glare. The completed project would not include any lighting or reflective materials, and so would not introduce a new source of substantial light or glare to the area. Therefore, project implementation would cause no impact with respect to lighting or glare.

References

California Department of Transportation (Caltrans), 2017. California Scenic Highway Mapping System, http://www.dot.ca.gov/hq/LandArch/16_livability/scenic_highways/index.htm, accessed May 3, 2017.

4.3.2 Agricultural and Forest Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
2. AGRICULTURAL AND FOREST RESOURCES — In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment project; and forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. **Would the project:**				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion

a, e) **No Impact**. The California Department of Conservation, Division of Land Resource Protection, maps important farmlands throughout California. Important farmlands are classified into categories on the basis of soil conditions (their suitability for agriculture) and current land use. The California Department of Conservation's Important Farmland Map for Marin County shows the project area as containing Farmland of Local Importance, Grazing Land and Other Land (DOC, 2016a). Since the project would not convert farmland to non-agricultural use, there would be no impact.

b) **No Impact**. According to the California Department of Conservation, there are no Williamson Act contracts on project lands (DOC, 2016b). As a result, there would be no impact to an existing Williamson Act contract.

c, d, e) **No Impact**. Land in the vicinity of the project site is not zoned as forest land or timberland. Construction of the project would not conflict with zoning regulations for forest land and would have no impact on forest land or timberland zoning. Therefore, the project would not result in any direct loss of forest land or lands currently in timber reserve. For these reasons, project implementation would have no impact on forestry resources.

References

California Department of Conservation (DOC), 2016a. Division of Land Resource Protection, Marin County Important Farmland 2014 map, July 2016.

California Department of Conservation (DOC), 2016b. Division of Land Resource Protection, Marin County Williamson Act FY 2015/2016 map, 2016.

4.3.3 Air Quality

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
3.	**AIR QUALITY —** Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. **Would the project:**				
a)	Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b)	Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c)	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d)	Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e)	Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

Discussion

a) **Less than Significant Impact**. Regulation of air pollution is achieved through both national and State ambient air quality standards and emission limits for individual sources of air pollutants. As required by the federal Clean Air Act, the U.S. Environmental Protection Agency (USEPA) has identified criteria pollutants and has established the National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. NAAQS have been established for the following pollutants: ozone (O_3); carbon monoxide (CO); nitrogen dioxide (NO_2); sulfur dioxide (SO_2); particulate matter less than 10 microns in diameter (PM_{10}); particulate matter 2.5 microns or less in diameter ($PM_{2.5}$); and lead (Pb). These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria. The State of California has also established its own more stringent set of air quality standards commonly referred to as the California Ambient Air Quality Standards (CAAQS). In addition to the criteria pollutants identified above, CAAQS have been established for sulfates, hydrogen sulfide, and vinyl chloride.

The proposed project site is located within the San Francisco Bay air basin (SFAB), which is currently designated as a nonattainment area for state and national ozone standards and as a nonattainment area for the state particulate matter (PM_{10} and $PM_{2.5}$) standards. The Bay Area Air Quality Management District (BAAQMD)'s Final Bay Area 2017 Clean Air Plan outlines control strategies to reduce emissions of ozone and ozone precursors to help the Bay Area achieve attainment for the State 1-hour ozone standard (BAAQMD, 2017a).

Since air pollutant emissions are a function of population and human activity, emission reduction strategies set forth in the Final Bay Area 2017 Clean Air Plan were developed based on regional population, employment, and housing projections. The proposed project would not facilitate an increase in population in the air basin nor would it generate housing or employment opportunities leading to increased population or vehicle miles travelled in the region. As such, the proposed project would be consistent with the assumptions contained within the Final Bay Area 2017 Clean Air Plan and would result in a less than significant impact.

b) **Less than Significant with Mitigation**. Restoration activities would begin during the summer months of 2018 and last approximately three months. Restoration of the Lagunitas Creek would consist of the demolition and removal of remnants of former structures at Sites 1 and 2, biotechnical bank enhancements, floodplain enhancement, new secondary channel, in-channel enhancements, and native vegetation restoration. For this analysis, it is assumed that an excavator, front-end loader and small bulldozer would be operating during all restoration phases at Sites 1 thorough 3.

Restoration activities would involve use of equipment and materials that would cause ozone precursor emissions (ROG and NO_x) as well as emissions of PM_{10} and $PM_{2.5}$. Restoration activities would also result in the emission of other criteria pollutants from equipment exhaust, restoration-related vehicular activity, and worker vehicle trips. Emission levels for construction activities would vary depending on the number and type of equipment, duration of use, operation schedules, and the number of construction workers. Emissions of ROG and NO_x from these sources would incrementally add to the regional atmospheric loading of ozone precursors during the restoration of the Lagunitas Creek.

The BAAQMD' Revised Draft Justification Report on CEQA Thresholds of Significance identifies significance thresholds for criteria pollutant emissions: a threshold of 54 pounds per day for ROG, oxides of nitrogen (NO_x) and $PM_{2.5}$ and 82 pounds per day for PM_{10} (construction equipment emissions only, exclusive of fugitive dust). These thresholds are based on the trigger levels for the federal New Source Review Program and BAAQMD's Regulation 2, Rule 2 for new or modified sources, and exceeding the thresholds represent a cumulatively considerable contribution to air quality. For mitigation of fugitive dust emissions, the BAAQMD recommends using specific best management practices, which has been a practical and effective approach to control fugitive dust emissions. The guidelines note that individual measures have been shown to reduce fugitive dust by anywhere from 30 percent to more than 90 percent and conclude that projects that implement construction best management practices will reduce fugitive dust emissions to a less than significant level. To ensure implementation of BAAQMD's recommended BMPs, they are identified in the mitigation measure **MM AIR-1**.

There would be no change in the operations at the project site; hence the project would result in no operational emissions. The project impact was analyzed for the proposed restoration activities using California Emissions Estimator Model (CalEEMod) version 2016.3.1. As summarized in **Table 4-1**, the results of the analysis indicate that

maximum average daily construction emissions of NOx would exceed the BAAQMD significance thresholds. Therefore, the proposed project would have a significant impact from restoration-related emissions. However, as shown in **Table 4-2**, implementation of the mitigation measure **MM AIR-1** would reduce restoration emissions to below the BAAQMD average daily emissions threshold by requiring a project wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent Air Resources Board (ARB) fleet average.

TABLE 4-1
UNMITIGATED AVERAGE DAILY RESTORATION EMISSIONS
(POUNDS PER DAY)[a]

Restoration Year	ROG	NO_x	PM_{10} (Exhaust)	$PM_{2.5}$ (Exhaust)
2018	5.9	65.7	3.1	2.8
BAAQMD Thresholds of Significance	54	54	82	54
Significant (Yes or No)?	No	Yes	No	No

[a] Emissions include results modeled with CalEEMod, version 2016.3.1. Total construction emissions over the 3-month duration of construction were divided by the active days of construction in order to determine the average daily construction emissions. Additional data and assumptions are described in **Appendix C**.

[b] BAAQMD's construction-related significance thresholds for PM_{10} and $PM_{2.5}$ apply to exhaust emissions only and not to fugitive dust.

TABLE 4-2
MITIGATED AVERAGE DAILY RESTORATION EMISSIONS
(POUNDS PER DAY)[a,b,c]

Restoration Year	ROG	NO_x	PM_{10} (Exhaust)	$PM_{2.5}$ (Exhaust)
2018	5.9	53.9	2.5	2.3
BAAQMD Thresholds of Significance	54	54	82	54
Significant (Yes or No)?	No	No	No	No

[a] Emissions include results modeled with CalEEMod, version 2016.3.1. Total construction emissions over the 3-month duration of construction were divided by the active days of construction in order to determine the average daily construction emissions. Additional data and assumptions are described in **Appendix C**.

[b] BAAQMD's construction-related significance thresholds for PM_{10} and $PM_{2.5}$ apply to exhaust emissions only and not to fugitive dust.

MM AIR-1: During restoration activities, the following BAAQMD-recommended measures shall be implemented to control fugitive dust and NOx emissions:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.

2. All haul trucks transporting soil, sand, or other loose material off-site shall be covered.

3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping shall be prohibited.

4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour.

5. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to five minutes (as required by the California airborne toxics control measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

6. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications.

7. The project shall be carried out in accordance with a plan, to be developed prior to project commencement, that provides for the off-road equipment (more than 50 horsepower) used in the construction project (i.e., owned, leased, and subcontractor vehicles) to achieve a project wide fleet-average 20 percent NO_X reduction and 45 percent PM reduction compared to the most recent Air Resources Board (ARB) fleet average. Acceptable options for reducing emissions include the use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, add-on devices such as particulate filters, and/or other options as such become available.

c) **Less than Significant Impact**. According to the BAAQMD CEQA guidelines, for a project to have a less-than-significant cumulative impact on air quality it must not have an individually significant operational air quality impact and it must be consistent with the local general plan as well as the regional air quality plan (BAAQMD, 2017). As demonstrated in a) above, the proposed project would be consistent with the adopted Bay Area 2017 Clean Air Plan. Although emissions from the proposed restoration activities would exceed the BAAQMD's construction significance threshold for NOx, these emissions would be temporary and would not result in any new permanent sources of emissions within the project area once restoration is complete. As such, the proposed project would not conflict with an applicable local or regional air quality plan, and the cumulative impacts would be less than significant.

d) **Less than Significant Impact**. Restoration activities associated with the proposed project would result in short-term emissions of diesel PM, which is a toxic air contaminant (TAC). Diesel PM poses a carcinogenic health risk that is measured using an exposure period of 30 years. The exhaust of off-road heavy-duty diesel equipment would emit diesel PM during restoration of the Lagunitas Creek.

The dose to which receptors are exposed is the primary factor used to determine health risk (i.e., the potential exposure to be compared to applicable standards). Dose is a function of the concentration of a substance or substances in the environment and the duration of exposure to the substance. Dose is positively correlated with time, meaning that a longer exposure period would result in a higher exposure level for the maximally exposed individual. Thus, the risks estimated for a maximally exposed individual are

higher if a fixed exposure occurs over a longer period of time. According to the Office of Environmental Health Hazard Assessment (OEHHA, 2015), carcinogenic health risk assessments, which determine the exposure of sensitive receptors to TAC emissions, should be based on a 30-year exposure period; however, such assessments should be limited to the period or duration of activities associated with proposed restoration activities.

The proposed restoration period would be much less than the 30-year period used for risk determination, lasting approximately two years. Because off-road heavy-duty diesel equipment would be used only for short time periods, construction activities would not expose sensitive receptors to substantial emissions of TACs. This impact would be less than significant.

e) **Less than Significant Impact**. Diesel equipment used during project construction may emit objectionable odors associated with combustion of diesel fuel. However, these emissions would be temporary and intermittent in nature, thus odor impacts associated with diesel combustion during construction activities would be less than significant.

References

Bay Area Air Quality Management District (BAAQMD). 2017a. *Bay Area 2017 Clean Air Plan*. Adopted April 19, 2017.

Bay Area Air Quality Management District (BAAQMD), 2017b. *BAAQMD CEQA Guidelines*, May 2017.

Office of Environmental Health Hazard Assessment (OEHHA). *Risk Assessment Guidelines*. February 2015

4.3.4 Biological Resources

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
4.	**BIOLOGICAL RESOURCES — Would the project:**				
a)	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 California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c)	Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d)	Interfere substantially with the movement of any native 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?	☐	☐	☒	☐
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f)	Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion

a) **Less than Significant Impact with Mitigation**. See the discussion of Special Status Species in Section 3. As discussed in this section, implementation of the following mitigation measures would reduce impacts to less-than-significant levels.

MM BIO-1: Seasonal Avoidance of Sensitive Aquatic Species. In-water construction work with the potential to result in short-term impacts to sensitive aquatic species, including project activities that are expected to create turbidity or disturb the streambed, shall be conducted only from June 15 through October 15.

MM BIO-2: Relocation of Special Status Fish. If necessary, fish shall be captured and relocated to avoid injury and mortality and minimize disturbance during construction. NPS would be the point of contact for any fish relocation activities and results. The following guidelines shall apply:

1. The project sponsor shall consult with NPS, with NOAA Fisheries (under Section 7 of the federal Endangered Species Act) and with CDFW (under Section 1600 of the California Endangered Species Act) to provide preservation and avoidance measures commensurate with the CDFW standards for the affected species.

2. The capture and relocation of Coho Salmon and coastal steelhead associated with work site clear-water creek diversions would require an Incidental Take Permit under Section 2081 of the California Fish and Game Code, or a Safe Harbor Agreement, to be issued by the CDFW. A Safe Harbor Agreement shall be obtained prior to implementing fish relocation actions.

3. Prior to and during the initiation of construction activities, a qualified CDFW- and NMFS-approved biologist and other approved fisheries biologists shall be present during installation and removal of clear-water creek diversions.

4. For sites that require flow diversion and exclusion, the work area will be blocked by placing fine-meshed nets or screens above and below the work area to prevent state or federally listed species from re-entering the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed to prevent fish from passing under the screen and avoid scour by flow. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked twice daily (at the beginning and end of each work day) and cleaned of debris to permit free flow of water.

5. Before removal and relocation begins, a qualified fisheries biologist will identify the most appropriate release location(s). In general, release locations should have water temperatures similar to (<3.6°F difference) the capture location and offer ample habitat (e.g., depth, velocity, cover, connectivity) for released fish, and should be selected to minimize the likelihood of reentering the work area or becoming impinged on exclusion nets or screens.

6. The means of capture will depend on the nature of the work site, and will be selected by a qualified fisheries biologist. Complex stream habitat may require the use of electrofishing equipment (e.g., Smith-root LR-24 backpack electrofisher), whereas in outlet pools, aquatic vertebrates and invertebrates may be captured by pumping down the pool and then seining or dipnetting. Electrofishing will be used only as a last resort; if electrofishing is necessary, it will be conducted only by properly trained personnel following the NMFS guidelines dated June 2000 (NMFS, 2000).

7. When feasible, initial fish relocation efforts will be performed several days prior to the scheduled start of construction. To the extent feasible, flow diversions and species relocation will be performed during morning periods. The fisheries biologist will survey the flow exclosures throughout the diversion effort to verify that no state or federally listed fish or aquatic invertebrates are present. Afternoon pumping activities should generally not occur and pumping should be limited to days when ambient air temperatures are not expected to be high. Air and water temperatures will be measured periodically, and flow diversion and species relocation activities will be suspended if temperatures exceed the limits allowed by NMFS guidelines.

8. Handling of fish and aquatic invertebrates will be minimized. When handling is necessary, personnel will wet hands or nets before touching them.

9. Prior to translocation, any state or federally listed species that are collected during surveys will be temporarily held in cool, aerated, shaded water using a five-gallon container with a lid. Overcrowding in containers will be avoided; at least two containers will be used and no more than 25 fish will be kept in each bucket. Aeration will be provided with a battery-powered external bubbler.

Fish will be protected from jostling and noise, and will not be removed from the container until the time of release. A thermometer will be placed in each holding container and partial water changes will be conducted as necessary to maintain a stable water temperature. Special-status fish will not be held more than 30 minutes. If water temperature reaches or exceeds NMFS limits, the fish and other aquatic species will be released and relocation operations will cease.

10. If state or federally listed fish are abundant, capture will cease periodically to allow release and minimize the time fish spend in holding containers.

11. Fish will not be anesthetized or measured. However, they will be visually identified to species level, and year classes will be estimated and recorded.

12. Reports on fish relocation activities will be submitted to CDFW and NMFS in a timely fashion.

13. If mortality during relocation exceeds three percent (or as determined by NMFS), relocation will cease and CDFW and NMFS will be contacted immediately or as soon as feasible.

MM BIO-3: Impacts to Rare Plants.

1. A qualified biologist shall conduct a pre-construction survey for special status plant species with the potential to occur within the area of disturbance. At least two surveys shall be completed, one in winter or early spring to capture the flowering period of Western leatherwood and one in summer to capture the flowering period of California bottle brush grass. The surveys shall be floristic in nature and shall follow the procedures outlined in the California Department of Fish and Wildlife Publication *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Commu*nities (CDFW, 2009).

2. If special status plant species are found, SPAWN shall coordinate with NPS, USFWS, and CDFW to provide preservation and avoidance measures commensurate with the standards provided in applicable NPS, USFWS, and CDFW protocols for the affected species. The preservation and avoidance measures shall include, at a minimum, appropriate buffer areas clearly marked during project activities with orange fencing, monitoring by a qualified plant biologist, and the development and implementation of a replanting plan.

MM BIO-4: Contractor Environmental Awareness Training and Site Protection. All construction personnel that are working in areas of potential endangered species habitat shall attend an environmental education program delivered by a qualified biologist prior to working on the project site. The program shall include an explanation as how to best avoid the accidental take of California freshwater shrimp, California red-legged frog, listed birds and fish species. The program shall also include how to identify and avoid Japanese knotweed, and what to do if new plants are found.

The training session shall be mandatory for contractors and all construction personnel. The field meeting shall include topics on species identification, life history, descriptions, and habitat requirements during various life stages. Emphasis shall be placed on the importance of the habitat and life stage requirements within the context of project maps showing areas where minimization and avoidance

measures are being implemented. The program shall include an explanation of appropriate federal and state laws protecting endangered species.

The contractor shall provide closed garbage containers for the disposal of all trash items (e.g., wrappers, cans, bottles, food scraps). The site shall be cleaned of litter before closure each day, and placed in wildlife-proof garbage receptacles. Construction personnel shall not feed or otherwise attract any wildlife in the project area. No pets, excluding service animals, shall be allowed in the project area.

MM BIO-5: Avoid or Minimize Impacts to Special Status Species.

***California Freshwater Shrimp*:** Prior to commencing construction, trees and vegetation overhanging into the wetted creek channel lining the banks at each restoration site will be surveyed for the presence of undercut root masses (i.e., potential winter habitat). If trees with such features are identified, they will be avoided during construction, as feasible. Avoidance measures will include adjusting grading limits. In addition, construction crews shall be directed to retain riparian vegetation near the margins of the low flow channel, as feasible. Avoidance measures may include adjusting grading limits and reducing the area of flow diversions. Large wood structures shall be placed and constructed to avoid existing habitat to the greatest extent feasible. If relocation is required, a qualified USFWS and CDFW-approved biologist will perform the relocation of California freshwater shrimp, according to the following measures:

1. At least 15 days prior to the onset of activities, the name(s) and credentials of biologists who will conduct California freshwater shrimp survey and relocation activities shall be submitted to the USFWS and CDFW for approval.

2. No in-channel work activities shall begin until proponent has received written approval from the USFWS and CDFW that the biologist(s) is qualified to conduct the work, and take authorization has been secured under FESA Section 7 and CESA Section 2081.

3. Before removal and relocation begins, the biologist shall identify the most appropriate release location(s). Suitable habitat is defined as creek sections that will remain wet over the summer and where banks are structurally diverse with undercut banks, exposed fine root systems, overhanging woody debris, or overhanging vegetation.

4. California freshwater shrimp shall be captured by hand-held nets [e.g., heavy-duty aquatic dip nets (12-inch D-frame net) or small minnow dip nets] and relocated out of the work area in the net or placed in buckets containing stream water and then moved directly to the nearest suitable habitat in the same branch of the creek.

5. No California freshwater shrimp shall be placed in buckets containing other aquatic species. Handling shall be minimized, as feasible.

6. California freshwater shrimp shall not be held more than 30 minutes.

7. Any California freshwater shrimp rescued or relocated shall be reported to the NPS, USFWS and CDFW.

8. Release locations should offer ample habitat and should be selected to minimize the likelihood of reentering the work area. To prevent California

freshwater shrimp from reentering the work area, the channel will be blocked by placing fine-meshed nets or screens above and below the work area. To minimize entanglement, mesh diameter will not exceed 1/8 inch. The bottom edge of the net or screen will be secured to the channel bed. Exclusion screening will be placed in low velocity areas to minimize impingement. Screens will be checked periodically and cleaned of debris to permit free flow of water. At the completion of in-stream work, all temporary materials would be completely removed.

California Red-legged Frog and Western Pond Turtle:

1. The name(s) and credentials of the qualified biologist(s) to act as construction monitors shall be submitted to the USFWS for approval at least 15 days before construction work begins.

2. Vegetation shall be cleared to 18 inches prior to conducting surveys for California red-legged frogs.

3. No more than 24 hours before initial ground disturbance activities, including grading and excavation, an approved biologist shall conduct onsite monitoring for the presence of California red-legged frog and other special status species with potential to be present, such as western pond turtle, in the area where ground disturbance or vegetation removal shall occur. Areas of dense vegetation may be mowed or trimmed to 18 inches in height, in order to more effectively survey for frogs.

4. Vegetation may be cleared to ground level within 24 hours after being cleared for California red-legged frogs.

5. At the beginning of each workday that includes initial ground disturbance, including grading, excavation, and vegetation-removal activities, an approved biologist shall conduct onsite monitoring for the presence of these species in the area where ground disturbance or vegetation removal shall occur. Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fence.

6. All excavated or deep-walled holes or trenches greater than 2 feet deep shall be covered at the end of each workday using plywood, steel plates, or similar materials, or escape ramps shall be constructed of earth fill or wooden planks to allow animals to exit. Before such holes are filled, they shall be thoroughly inspected for trapped animals.

7. If a special status species is present within the exclusion fence area during construction, work shall cease in the vicinity of the animal, and the animal shall be allowed to relocate of its own volition. If the animal does not relocate of its own volition, the animal shall be relocated in accordance with the California Red-legged Frog Relocation Plan (Appendix E). NPS will be notified about any California red-legged frog sightings and removals.

8. The contractor shall maintain the temporary fencing—both exclusion fencing and protective fencing (if installed)—until all construction activities are completed. No construction activities, parking, or staging shall occur beyond the fenced exclusion areas. Perimeter fences shall be inspected to ensure they do not have any tears or holes, that the bottoms of the fences are still buried, and that no individuals have been trapped in the fence. After construction is

completed, the exclusion fencing and associated debris shall be removed and stored or disposed of off-site.

Northern Spotted Owl and Nesting Birds: Tree removal activities will be avoided during the nesting season (February 1 to July 31) unless a nesting bird survey shows that no nesting activity is present. Prior to construction, a qualified biologist will conduct a nesting bird survey in the project area and areas within 1/2-mile. The four nearby spotted owl activity centers (Bike Path, McIsaac, Cheda Creek, and Jewel Trail) will be avoided with a buffer of 1/4-mile during the active nesting season. NPS will conduct spotted owl nesting surveys if necessary, according to USFWS protocol. Other nesting birds will be avoided by a suitable buffer determined in coordination with NPS. Construction work may continue outside of the no-work buffer.

Bats: Prior to project construction, a qualified bat biologist shall conduct a pre-construction survey for roosting bats in trees to be removed or pruned and structures to be demolished. If no roosting bats are found, no further action is required. If a bat roost is found, the following measures shall be implemented to avoid impacts on roosting bats.

1. If active maternity roosts are found in trees or structures that will be removed or demolished as part of project construction, tree removal or demolition of that structure shall commence before maternity colonies form (generally before March 1) or after young are flying (generally by July 31). Active maternal roosts shall not be disturbed.

2. If a non-maternal roost of bats is found in a tree or structure to be removed or demolished as part of project construction, the individuals shall be safely evicted, under the direction of a qualified bat biologist and with approval from NPS. Removal or demolition shall occur no sooner than at least two nights after the initial minor site modification (to alter airflow). Departure of the bats from the construction area will be confirmed with a follow-up survey prior to start of construction.

b) **Less than Significant Impact with Mitigation**. See the discussion of Vegetation in Chapter 3.3. As discussed in this chapter, implementation of the following mitigation measure would reduce impacts to less-than-significant levels.

MM VEG-1: General Native Vegetation Protection.

1. Before construction begins, the project engineer and a qualified biologist will identify locations for equipment and personnel access and materials staging that will minimize riparian vegetation disturbance.

2. During construction, as much native understory brush and as many native trees as possible will be retained. The emphasis will be on retaining shade-producing and bank-stabilizing vegetation. Woodrat nests will be avoided.

3. All trees to remain during construction within the grading area will be protected and trimmed in the fall or winter, if necessary, to ensure their trunks and/or limbs are not disturbed during construction.

4. When heavy equipment is required, unintentional soil compaction will be minimized by using equipment with a greater reach, or using low-pressure equipment. Disturbed soils will be decompacted when work is completed.

5. All vehicles and equipment entering each project site (Sites 1, 2, and 3) shall be clean of noxious weeds and free from oil leaks, and are subject to inspection. Noxious weeds could spread between sites as well as from outside the project area. All construction equipment shall be washed thoroughly to remove all dirt, plant, and other foreign material prior to entering and leaving the project area. Particular attention shall be shown to the under-carriage and any surface where soil containing exotic seeds may exist. These efforts are critical to prevent the introduction and establishment of non-native plant species into each project site. Arrangements shall be made for inspections of each piece of equipment before entering each project site, and records of inspections will be maintained. Equipment found operating on the project site that has not been inspected or has oil leaks will be shut down and may be subject to citation.

6. Certified weed-free permanent and temporary erosion control measures shall be implemented to minimize erosion and sedimentation during and after construction.

7. The project sponsor shall conform to the Federal Seed Act, the Federal Noxious Weed Act, and applicable state and local seed and noxious weed laws.

8. Nursery operations where plants are stored, propagated, or purchased must demonstrate implementation of best management practices to reduce pest and pathogen contamination within their nursery.

9. Any disturbed and decompacted areas outside the restoration area will be revegetated with locally native vegetation found in the Lagunitas Creek Watershed.

10. Revegetated areas shall be protected and cared for, including watering when needed, until restoration criteria have been met under project permits and/or NPDES standards. Revegetated areas shall be monitored in accordance with permit requirements to ensure success criteria are met.

MM VEG-2: Vegetation Monitoring and Management Plan.

1. SPAWN shall prepare a Vegetation Monitoring and Management Plan in consultation with NPS. The plan shall describe required salvage and replanting protocols prior to and after construction is complete. This plan shall include, but not be limited to, protocols for replanting of vegetation removed prior to or during construction, and management and monitoring of the plants to ensure replanting success. To the extent feasible and within the goals of the restoration project, native riparian vegetation within the project area shall be salvaged prior to construction and replanted after construction is completed. Areas impacted from construction-related activity shall be replanted or reseeded with native trees, shrubs, and herbaceous perennials and annuals from the watershed or nearby watershed under guidance from NPS-PRNS biologists.

2. Replanting shall be conducted using NPS standard operating procedures, such as preparation of soil conditions, use of NPS approved native plants, plant protection, irrigation or watering if necessary, and control of aggressive nonnative species.

3. SPAWN shall submit the pre-construction survey protocols for all special-status species and the Vegetation Monitoring and Management Plan to NPS for review and approval as part of the Special Use Permit approval.

4. To the extent feasible, SPAWN shall use local plant materials for revegetation of the disturbed area. The plant materials shall include local cuttings from the local watershed or from adjacent watersheds. The Vegetation Monitoring and Management Plan shall take into account that use of container plants that meet this source criteria may add additional time to the revegetation process in that the materials need to be collected and provided to a contractor well in advance before the expected planting date. This will ensure that the seeds can be collected during the appropriate season and the container plants will be of an appropriate size for out-planting. Using local cuttings can reduce the length of this phase.

MM VEG-3: Invasive Plants.

The following steps will be taken to minimize the spread of invasive plants in the Lagunitas Creek watershed:

1. Construction activities will be planned and laid out to avoid any existing Japanese knotweed as much as possible, with the goal of avoiding all existing patches (this includes any part of the site that would experience disturbance – such as equipment travel, soil movement, significant vegetation removal and rerouting of the creek).

2. A 20-foot buffer will be demarcated with orange fencing around these project areas so that no travel will occur within the area of expected above and below ground FAJA growth. SPAWN to provide materials, and NPS to install fencing.

3. A Japanese knotweed site (aka FAJA Buffer Zone) is defined as the perimeter of the 2017 survey extent of the site plus a buffer of 20 feet.

4. Disturbance is defined as driving across site, excavating, or anything that will render the site more vulnerable to erosion in the future.

5. If sites cannot be avoided SPAWN will submit a request and rationale for not being able to avoid the FAJA Buffer Zone. SPAWN will be responsible for any monitoring and treatment of these penetrated zones. Crane mats will be used in the area of movement within the buffer zone. No construction or travel will take place within the 2017 FAJA footprint. This includes no vegetation removal within the small footprint unless approved of by the NPS FAJA point of contact.

6. SPAWN will conduct a botanical survey in June for FAJA. The presence of this species will be mapped as a point and an estimation of how large the site is (square meters, % cover, numbers of stems and a column for comments, and another for an estimation whether the site can be avoided). Point data will be sent as a shapefile to NPS and the table in excel.

7. Invasive species, identified below, will be treated before the migration of heavy equipment and staging within the project area. The removal of these species will be with manual equipment. The NPS may treat 2017 FAJA patches in autumn of 2018 while construction is occurring. Construction activities and equipment will be away from 2017 FAJA sites so NPS can treat the patches when appropriate. SPAWN will be responsible for the treatment of non-FAJA

invasive species by manual removal. Many invasive species are growing on the disturbed fill pads where old structures were located. These include bull thistle, poison hemlock, Himalayan blackberry, and periwinkle (vinca). SPAWN will work to prevent these species from seeding onto the site prior to construction activities through cutting, mowing, and manual pulling. During the grubbing phase of the project, SPAWN will work with the contractor(s) to scrap the topsoil from the fill pads and carefully discard these spoils and transport the material to a landfill where the material can be capped. Removal of the seed bank of these invasive species will help prevent the recolonization of these plants following construction.

8. Any patches of Japanese knotweed that cannot be avoided will be excavated to a depth of 10 feet and a perimeter of 20 feet from the edge of the population. Any excavations will be backfilled with local, native soil. Material will be buried to a depth of 15 feet and filled and compacted with native soil on site. The footprint of this activity will be scraped to a depth of 3" to skim any material dropped – or – if this is considered too onerous, an approved containment of the material during the migration process should be outlined and NPS approved three months before the start of the project.

9. If there is no other option but to work within the FAJA buffer zone, SPAWN will provide written plans and justifications for not being able to adhere to this activity and how alternatives were considered. Both a NPS and SPAWN representative will replace orange fencing to accommodate this adjustment. SPAWN shall notify NPS of the construction schedule 3 weeks in advance of activity to allow NPS to observe and monitor as seen fit. Excavation of FAJA will require a full time NPS monitoring and documentation.

10. SPAWN will coordinate with NPS to have the FAJA patches within the project area treated with herbicide by NPS crews during construction activities when it is most optimal for herbicides to be effective.

11. NPS Monitoring is secondary to a SPAWN biomonitor, however, the selection of the monitor should have solid experience in monitoring construction projects for biological concerns. NPS should be given a minimum of a two week notice on schedule so that NPS visits to the site can be planned in advance.

12. SPAWN monitor should keep the NPS contacts apprised on a weekly basis and if there are problems or concerns all park contacts should be emailed. In particular, any unexpected actions should be included in this report (emergency actions). All other changes need to go through the approval process outlined by the park.

13. All methods proposed for FAJA mitigation are the ultimate responsibility of SPAWN and will be researched thoroughly well in advance of project dates (e.g. fumigation, incineration, working with County on options, etc.).

14. SPAWN should keep all contractors apprised of any herbicide activity that is planned.

15. Following construction, SPAWN will coordinate post-construction monitoring with NPS and conduct surveys for Japanese knotweed along the riparian area as an element of the project's effectiveness monitoring plan. Surveys will include the sites and the downstream areas of influence created by the new structures (minimum of ¼ river mile).

16. SPAWN will participate in monthly monitoring from March to July of FAJA growth at the restoration sites as a measure of first response to FAJA colonization following construction. This will include surveys for sprouts and documentation of their proximity to the OHWM and estimated stem count. If any new patches are found within the SPAWN project sites, SPAWN will document these with GPS and submit to NPS. If SPAWN or NPS documents new FAJA patches within the project sites that are below the OHWM, SPAWN will implement a manual treatment regime consistent with the NPS protocol of carful removal of entire root masses and lateral roots by hand and discard into black plastic garbage bags. This treatment will occur monthly. If new patches are discovered above the OHWM, NPS may apply herbicide treatment when optimal. SPAWN shall be responsible for monitoring FAJA within the project footprints and treating manually if new patches are found below the OHWM for a period of 5 years following construction.

17. SPAWN should be cognizant of the potential for movement of FAJA from MMWD's site 1 and 2 just upstream. Survey's should be conducted for 5 years after the restoration activities.

18. All activities shall be approved by the Water Quality Control Board, California Department of Fish and Wildlife, and PORE staff.

19. Care for other key non-natives on site:

    1. Himalayan blackberry
    2. Greater periwinkle
    3. Montbretia or Crocosmia
    4. Bull thistle
    5. Poison hemlock
    6. Forget-me-not

NPS Staff will provide:

1. SPAWN with a schedule of herbicide applications, safety data sheets and herbicide labels, and details around re-entry times. SPAWN will be responsible for working with contractors and staff to ensure this is communicated and re-entry is clear.

2. One primary project manager for the restoration projects that will attend meetings, and be able to provide insight on the group of cross-discipline issues. This project manager will need to provide updates to the NPS staff and ensure that NPS has representation at meetings.

3. GPS points and other data on Japanese knotweed will be provided to SPAWN. SPAWN will continue to coordinate and collaborate with NPS on NPS's Japanese knotweed eradication efforts on NPS lands within the Lagunitas Creek watershed.

4. NPS will make spontaneous visits and will be equipped with proper PPE (hard hats, vests, etc).

General Suggestions to be vetted by PORE staff:

1. SPAWN to host pre construction meeting with calendar of events for all PORE and regulator staff.

2. Identify a mechanism for reporting issues to park (oil spills, resource concerns, issues with regulators,
3. Demonstrate they have clear crosswalking of all FAJA sites, and resource concerns via integrated mapping.
4. Any change of plans will be approved by the project manager at the park and all parties involved will be notified.
5. Clarify for project manager what the scope of authority is and what the process is for stopping construction (if needed). Hopefully this won't be needed, but without this clarity it is ambiguous.
6. Identify what repercussions will be if mitigation and agreements to plans are not in accordance with actions.

Communications:

At the earliest possible juncture, provide park with a preliminary and final map (and shapefiles) of construction zone with all areas identified (access, staging, installation sites, and buffer). The nature of the sites should be well marked (so person interpreting it will know what the proposed action will entail).

c) **Less than Significant Impact with Mitigation**. See the discussion of wetlands in Section 3.1, Soils and Water. As discussed in Section 3.1, Soils and Water, indirect adverse effects on wetlands and water could include impacts to water quality during construction. However, these water-quality-related indirect effects to wetlands and waters would be minimized by implementation of the SWPPP as required by the GCP. Impacts to wetland vegetation would be minimized by implementation of **MM VEG-1** (general native vegetation protection), **MM VEG-2** (vegetation monitoring and management plan), and **MM VEG-3** (invasive plants), which would reduce impacts to less-than-significant levels.

d) **Less than Significant Impact**. The project would have limited, temporary impacts on wildlife movement in the channel and associated riparian area during construction. Following construction, wildlife movement would be improved by removal of debris and floodplain and riparian enhancement associated with project implementation. Impacts on wildlife movement and corridors would be less than significant.

e) **No Impact**. No applicable local ordinances apply to the project site, which is on National Park Service land.

f) **No Impact**. No Habitat Conservation Plans or other conservation plans apply to the project site, which is on National Park Service land.

4.3.5 Cultural Resources

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
5.	**CULTURAL RESOURCES — Would the project:**				
a)	Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b)	Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☒	☐	☐
c)	Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d)	Disturb any human remains, including those interred outside of formal cemeteries?	☐	☒	☐	☐

Environmental Setting

The existing cultural resource conditions in the project area are described in Chapter 3.5, Cultural Resources.

Discussion

a) **No Impact**. The proposed project could result in a significant impact if it caused a substantial adverse change to a historical resource (architectural resources or the built environment, including buildings, structures, and objects). A substantial adverse change includes the physical demolition, destruction, relocation, or alteration of the resource. Archaeological resources that are also considered historical resources are considered below under discussion b-d).

There are no architectural resources of the built environment in the proposed project area. The project would not have an impact on historical resources of the built environment and no mitigation is necessary.

b, d) **Less than Significant Impact with Mitigation**. The project could have an impact on archaeological resources if it caused a substantial adverse change in the significance of an archaeological resource including those that qualify as historical resources according to CEQA Guidelines Section 15064.5, unique archaeological resources as defined in CEQA Section 21083.2(g).

There are no known archaeological resources in the project area. There are no recorded instances of human remains occurring within the project area or in the immediate vicinity. While unlikely, there is the potential for the proposed project to encounter previously unidentified archaeological resources and/or human remains. As discussed in the Chapter 3.5, Cultural Resources, the following mitigation measures would reduce these impacts to a less-than-significant level.

MM CUL-1: In the event of any discovery of human remains, archaeological deposits, or any other type of cultural resource during construction, work shall stop work and the National Park Service archaeological staff shall be notified within 24 hours. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include refuse-filled privies or wells. Construction work shall be suspended immediately and shall not resume until the National Park Service re-authorizes project construction. If it is determined that the discovery is eligible for listing in the National Register, and cannot be avoided, the National Park Service will follow the procedures for Post Review Discoveries 36 CFR 800.13. If human remains are discovered, SPAWN shall implement measure MM CUL-2.

MM CUL-2: In the event of discovery or recognition of any human remains during construction activities, such activities within 100 feet of the find shall cease until the Marin County Coroner has been contacted to determine that no investigation of the cause of death is required. The NPS will be notified in the event of the discovery of human remains. The NPS will follow the procedures for the inadvertent discovery of human remains outlined in 43 CFR 10.4 in compliance with the Native American Graves Protection and Repatriation Act.

c) **No Impact**. Implementation of the project could result in a significant impact if the project could directly or indirectly destroy a unique paleontological resource or site.

The Society for Vertebrate Paleontology (SVP) has established professional standards for evaluating the potential for paleontological resources based on the type of geologic unit, the previous discovery of fossils within the geologic unit and within or in close proximity to a proposed project, and whether the fossils are uncommon. The project area is underlain by artificial fill and Holocene-age alluvial deposits. Based on the SVP criteria (2010), the project area has a low paleontological sensitivity and would not have an impact on paleontological resources. No mitigation is necessary.

References

Society of Vertebrate Paleontology (SVP), Assessment and mitigation of adverse impacts to nonrenewable paleontologic resources: standard guidelines, *Society of Vertebrate Paleontology News Bulletin*, 2010.

4.3.6 Geology, Soils, and Seismicity

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
6. GEOLOGY and Soils — Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? (Refer to Division of Mines and Geology Special Publication 42.)	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☒	☐	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☒	☐	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?[1]	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

Discussion

a.i) **Less than Significant Impact**. There are no active faults or potentially active faults underlying the project sites according to published geologic maps. The project is not located within an Alquist-Priolo Earthquake Fault Study Area. The Hayward-Rogers Creek Fault is located approximately 17 miles to the east of the project sites. The San Andreas Fault, identified as an Alquist Priolo fault, is approximately two miles west of the project sites.[2] Since the project is not located within an Alquist-Priolo Earthquake Fault Zone and no major faults have been mapped within or adjacent to the project sites, the likelihood of ground rupture from faulting across the project sites is low. Therefore, impacts related to rupture of a known earthquake fault resulting from implementation of the proposed project components are considered to be less than significant.

[1] The CBC, based on the International Building Code and the now defunct Uniform Building Code, no longer includes a Table 18-1-B. Instead, Section 1803.5.3 of the CBC describes the criteria for analyzing expansive soils.

[2] California Geological Survey (CGS), 2017. CGS Information Warehouse: Regulatory Maps. Available online at http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps. Accessed May 15, 2017.

a.ii) **Less than Significant Impact with Mitigation**. The project is located on the north side of San Francisco Bay, within the Coast Ranges geomorphic province of California near the San Andreas fault and the Hayward-Rogers Creek fault, and is susceptible to ground shaking in the event of an earthquake. Ground shaking from earthquakes can cause extensive damage to property and people. Factors that determine the amount of damage caused from ground shaking are interrelated and include the magnitude and depth of the earthquake, distance from the fault, duration of shaking, type of bedrock and soils, and topography, among others. The entire Bay Area, including Marin County, would be subject to strong ground shaking during earthquakes. The Association of Bay Area Governments rates the shaking severity level of the project area in the event of an earthquake as "Very Strong."[3]

There are no mapped active or potentially active faults underlying the project sites; however, because of its proximity to the San Andreas Fault Zone and other active faults, the project area could experience very strong intensity ground shaking during a large earthquake. According to the Working Group on California Earthquake Probabilities, the 2015 Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) (WGCEP, 2015) there is a 72 percent probability of a magnitude 6.7 or greater earthquake in the Bay Area within 30 years, with the greatest probabilities of earthquakes on the Hayward-Rogers Creek Fault and the San Andreas Fault, which are the two faults closest to the project sites. Therefore, the project area is very likely to experience very strong ground shaking from earthquakes in the future.

Ground shaking associated with earthquakes could affect the project by causing displacement of biotechnical bank stabilization structures, live poles, and in-channel enhancements including large wood structures. The 10 existing buildings located at Site 3 could potentially collapse into the project site if strong seismic groundshaking were to occur. However, the project does not involve modification of any of these structures and construction activities would not affect their stability. During construction, vehicles, equipment, and construction workers would be located adjacent to each project site in cleared areas or existing ROW. In the event of strong seismic ground shaking, humans exposed to displacement of habitat enhancement structures could potentially be injured. Construction, however, would be temporary, lasting approximately three-four months. Precautionary measures including adherence to state-mandated safety standards, including federal OSHA regulations (29 CFR 1910.120) and Cal/OSHA regulations (8 CCR Title 8, Section 5192) during construction would minimize hazards to construction workers associated with strong seismic ground shaking. To comply with these regulations, SPAWN shall retain a qualified professional to prepare a site-specific Health and Safety Plan (HASP), which is described in more detail in Chapter 3.6, as **MM HAZ-1b**. Through compliance with this Mitigation Measure construction workers and the general public would be protected from hazards associated with strong seismic ground shaking during

[3] Association of Bay Area Governments, 2017a. Shaking Hazard Map. Available online at http://resilience.abag.ca.gov/earthquakes/#FAULTS. Accessed May 15, 2017.

construction. Therefore, potential impacts during construction would be less than significant with mitigation under this criterion.

a.iii) **Less than Significant Impact**. Soil liquefaction is a phenomenon in which generally loose, saturated, cohesionless soils undergo a temporary decrease in strength during seismic ground-shaking and acquire a degree of mobility sufficient to permit ground deformation. The potential for liquefaction depends on the duration and intensity of earthquake shaking, particle size distribution of the soil, density of the soil, and groundwater elevation. Areas at risk of liquefaction typically have a high groundwater table underlying low- to medium-density, granular sediments, particularly younger alluvium and artificial fill. Within the project reach of Lagunitas Creek the underlying geology is composed primarily of Franciscan mélange, and topped with gravel. Franciscan mélange consists of a mixture of large blocks of varied lithologies and rock types including greenstone, sandstone, chert, some serpentine, and some artificial fill at Site 2, but no alluvium.[4] With the exception of the fill that will be removed as part of the project, these are generally high density rock types which are unlikely to mobilize or deform in the event of seismic ground-shaking. Furthermore, the three project sites occur in an area identified as having a "very low" potential for a liquefaction hazard, as mapped by the Association of Bay Area Governments.[5] Therefore, impacts would be less than significant under this criterion.

a.iv) **Less than Significant Impact with Mitigation**. The project reach is located in a narrow valley located within a hilly area. Steep slopes have the potential for erosion and slippage. Weak rocks and steep slopes are basic geologic characteristics that contribute to slope instability, including landslides. In susceptible areas, landslides can be triggered by earthquakes and high rainfall. Within the project reach of Lagunitas Creek, each side of the creek is backed by steep banks. Project Sites 1 and 3 would be constructed in an area with that has previous records of landslides as identified by ABAG, however project Site 2 would be constructed in an area identified as having a history of very few landslides.[6] While the soils within the creek are granular fluvents (such as gravel) which may be more susceptible to slope instability, the slopes surrounding the project site comprise denser soils (see criterion d, below). Regardless, the potential for loss, injury or death to construction workers would be high in the event of a landslide. With the implementation of Mitigation Measure **MM HAZ-1b**, however, precautionary safety action to prevent such exposure would reduce impacts to a less than significant level during construction.

b) **Less than Significant Impact**. Construction of the project would require minimal displacement of soil, with the exception of the removal of former fill at Sites 1 and 2. If not properly managed, substantial erosion of these stockpiled soils during construction could occur, and sediment could be transported into sensitive receiving waters. Because the proposed project would disturb more than one acre, the project would be required to

4 ESA, 2016. Final Report- Lagunitas Creek Floodplain and Riparian Enhancement. Appendix C, Geomorphic Assessment. Published February 2016.

5 ABAG, 2017b. Earthquake Scenarios- Scenario Liquefaction Potential GIS Data. Available online at http://resilience.abag.ca.gov/open-data/. Accessed May 16, 2017.

6 ABAG, 2017c. Earthquake Scenarios- Scenario Landslides Potential GIS Data. Available online at http://resilience.abag.ca.gov/open-data/. Accessed May 16, 2017.

comply with the state Construction General Permit (CGP). The CGP would require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that would include Best Management Practices (BMPs) designed to prevent erosion and control stormwater runoff, as described in Hydrology and Water Quality. This would aid stockpile management and reduce the risk of erosion and sediment transport outside of project work areas. Through compliance with the CGP during construction, impacts would be less than significant.

The project would include biotechnical bank stabilization measures at Sites 1 and 2, including installation of brush mats at cut banks along the back of the newly graded floodplain in order to preserve and protect the slope below Sir Francis Drake Boulevard. The brush mats utilize live cuttings from native trees, such as willow and alder, to stabilize and protect graded banks from eroding. The live cuttings root and sprout to establish as trees, which provide both stabilization of topsoil and habitat functions on the restored bank. The project would also involve revegetation of all three project sites, which would stabilize the soil and further prevent erosion and topsoil loss. Biotechnical bank stabilization measures, and vegetation management, proposed as part of the project would minimize the likelihood of erosion and topsoil loss post-construction. Therefore, impacts related to project operation would be less than significant under this criterion.

c) **Less than Significant Impact**. The geologic unit underlying the project sites is, as described above, Franciscan Mélange, consisting of dense rock types which are known to be relatively stable and less prone to landslides, lateral spreading, subsidence, liquefaction, or collapse. Soils underlying the project area, including fluvents[7] like Alluvium gravel, are more prone to erosion, but other soil types found within the project sites including Cronkite-Barnabe complex, and Tocaloma-Saurin association[8] are relatively stable. Impacts associated with landslides and liquefaction are discussed above in impacts aiii) and aiv). No activities that could cause subsidence, including groundwater, petroleum, or natural gas withdrawals are undertaken in the project area, nor are these activities proposed as part of the project (see Sections 9, Hydrology and Water Quality, and 11, Mineral Resources of this Initial Study). The potential for ground subsidence within the project site is therefore low. In addition, the potential adverse effects of instability of project site soils during the construction of the project would be adequately addressed through the construction methods outlined in Chapter 2, Alternatives which are focused on the least environmentally impacting approaches. Such approaches, which would improve soil stability, include moisture conditioning of soil not already saturated to achieve maximum stability, and ensuring deleterious materials are removed from soil prior to being placed or moved on-site. These types of measures, which are standard engineering practice and required through construction codes, ensure that small ground movements such as long-term soil consolidation or movements due to subsidence or collapsible soils do not damage or deteriorate structural components of the

7 Fluvents typically consist of Alluvium derived from igneous, metamorphic and sedimentary rock.

8 NRCS, 2017. Custom Soil Resource Report. Available online at https://websoilsurvey.sc.egov.usda.gov/WssProduct/gdtpvy5eocyvmgbfzaspzzss/GN_00000/20170516_20284108804_148_Soil_Report.pdf on May 16, 2017.

project. With the implementation of standard construction and engineering practices, impacts would be less than significant under this criterion.

d) **Less than Significant Impact**. The project would be located within and adjacent to a creek containing fluvents as well as Cronkite-Barnabe complex, and Tocaloma-Saurin association. According to the NRCS Soil Survey, the fluvents are not rated for linear extensibility (another term for expansion potential or shrink-swell), however the other soil types identified to occur immediately adjacent to and surrounding the fluvents found in the creek (Cronkite-Barnabe complex, and Tocaloma-Saurin association) have a low rating for linear extensibility. These areas occur adjacent to the Sir Francis Drake ROW and are those upon which construction staging would occur, if at all. Most staging during construction would occur within the paved or graded Sir Francis Drake ROW. As such, the project would have a low potential create substantial risks to life or property related to expansive soils during construction. During operation, workers monitoring the project sites would infrequently have to wade through the creek and monitor along the banks of each project site, however, monitoring would occur infrequently enough that expansion of soils resulting in risks to life or property are extremely unlikely. With regard to construction and operation, impacts would be less than significant under this criterion.

e) **No Impact**. No septic tanks or alternative wastewater disposal systems are included in the proposed project. Therefore, no impacts would occur under this criterion.

References

Association of Bay Area Governments (ABAG), 2017a. Shaking Hazard Map. Available online at http://resilience.abag.ca.gov/earthquakes/#FAULTS. Accessed May 15, 2017.

ABAG, 2017b. Earthquake Scenarios-Scenario Liquefaction Potential GIS Data. Available online at http://resilience.abag.ca.gov/open-data/. Accessed May 16, 2017.

ABAG, 2017c. Earthquake Scenarios-Scenario Landslides Potential GIS Data. Available online at http://resilience.abag.ca.gov/open-data/. Accessed May 16, 2017.

California Geological Survey (CGS), 2017. CGS Information Warehouse: Regulatory Maps. Available online at http://maps.conservation.ca.gov/cgs/informationwarehouse/index.html?map=regulatorymaps. Accessed May 15, 2017.

ESA, 2016. Final Report- Lagunitas Creek Floodplain and Riparian Enhancement. Appendix C, Geomorphic Assessment. Published February 2016.

NRCS, 2017. Custom Soil Resource Report. Available online at https://websoilsurvey.sc.egov.usda.gov/WssProduct/gdtpvy5eocyvmgbfzaspzzss/GN_00000/20170516_20284108804_148_Soil_Report.pdf. Accessed on May 16, 2017.

4.3.7 Greenhouse Gas Emissions

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
7. GREENHOUSE GAS EMISSIONS — Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☒	☐

Discussion

a) **Less than Significant Impact**. The proposed project would generate GHG emissions from temporary restoration activities, including from combustion of fossil fuels used in mobile equipment and power tools used for site preparation, excavation and grading. Since the Bay Area Air Quality Management District (BAAQMD) currently does not have an established GHG significance threshold for construction-related activities, GHG emissions emitted during project-related restoration activities are compared to the BAAQMD's annual 1,100 metric tons carbon dioxide equivalents (CO_{2e}) operational GHG threshold to determine significance (BAAQMD, 2017).

Given that the proposed project activities would be temporary in nature and would occur over the brief restoration timeframe described in Chapter 2, Alternatives, the proposed project is not expected to result in an ongoing burden to regional or global GHG inventories. The California Emissions Estimator Model (CalEEMod) indicates that project construction would result in an estimated 315 metric tons CO_{2e} in 2018. Details of the GHG modeling can be found in **Appendix C**. These emissions would be below any quantitative threshold considered by BAAQMD for GHG emissions. Therefore, GHG emissions associated with the proposed restoration activities represent a less than significant impact

b) **Less than Significant Impact**. The County of Marin has adopted the *Marin County Climate Action Plan*, which includes measures to reduce GHG emissions from building energy use, transportation, waste management, and land use (Marin County, 2015). Since the proposed project consists of the restoration of a portion of the Lagunitas Creek and would not alter the existing operation of the site, the proposed project would not conflict or obstruct the County's current climate action plan. Therefore, this impact would result in a less than significant impact.

References

Bay Area Air Quality Management District (BAAQMD), 20017. *Air Quality Guidelines.* May 2017.

Marin County, 2015. *Marin County Climate Action Plan*. July 2015.

4.3.8 Hazards and Hazardous Materials

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
8.	**HAZARDS AND HAZARDOUS MATERIALS — Would the project:**				
a)	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b)	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c)	Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d)	Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e)	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f)	For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g)	Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h)	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?	☐	☒	☐	☐

Discussion

a) **Less than Significant Impact**. Project construction would require the transportation, storage, use, and disposal of certain hazardous substances, such as, but not limited to, fuels, lubricants, degreasers, and oil routinely used during construction activities. Inadvertent release of these materials into the environment could adversely impact soil, surface waters, or groundwater quality and potentially result in a significant hazard. The NPS shall ensure that all construction-related hazardous materials and hazardous wastes be stored, handled, and used in a manner consistent with relevant and applicable federal, state, and local laws. Construction related hazardous materials and hazardous wastes shall also be staged and stored away from stream channels and steep banks to prevent them from entering surface waters in the event of an accidental release.

In addition, the project would be required to implement Best Management Practices (BMPs) as part of the required SWPPP designed to control stormwater runoff and

minimize the risk of a hazardous materials release during construction activities, as described in Section 9, Hydrology and Water Quality. With these measures in place potential impacts related to reasonably foreseeable upset and accident conditions involving the release of hazardous construction chemicals into the environment would be less than significant.

b) **Less than Significant Impact with Mitigation**. Project construction would involve demolition of the remaining remnants of residential structures as well as ground excavation activities up to 12 feet deep at Sites 1 and 2. The potential exists to encounter underground facilities such as septic sewer lines and for leaks in those structures to expose workers to hazardous materials.

A Hazardous Material Survey was conducted in the project area for all three proposed sites in 2015, which identified lead paint from on-site buildings (ACC Environmental Consultants, Inc., 2015). All above-ground structures and other hazardous materials (septic systems and fuel storage tanks) at Sites 1 and 2 were demolished and removed by the NPS in 2016. After removal of the above-ground structures at Sites 1 and 2, the area was regraded and the soil was mixed and disturbed. The soil has not been tested since the structures were removed from Sites 1 and 2 and there is a potential to encounter residual hazardous materials, such as lead or petroleum hydrocarbons, due to past contamination of the soil or groundwater during project construction. Any hazardous materials encountered in excavated soil or groundwater during project construction could result in a release to the environment, which could potentially expose construction workers and the public to hazardous materials.

If soil, groundwater, or other environmental medium with contamination is unexpectedly encountered during excavation or other construction activities, the impact on the environment or construction workers could be significant. Implementation of the following mitigation measures, **MM HAZ-1a**, **MM HAZ-1b**, and **MM HAZ-1c** would reduce impacts related to unanticipated exposure of hazardous materials to less than significant.

> **MM HAZ-1a: Pre-Construction Hazardous Materials Assessment.** Prior to construction, the project sponsor shall ensure that a limited soil and/or groundwater investigation is performed at the proposed construction work area to characterize soil and/or groundwater quality. The project sponsor shall conduct a site assessment (the "Pre-Construction Hazardous Materials Assessment") including potential testing of soil and/or groundwater, and if testing reveals soil and/or groundwater concentrations that exceed applicable regulatory levels, the project sponsor shall contact the County of Marin or Regional Water Quality Control Board (RWQCB), as appropriate, to secure regulatory oversight and the NPS Senior Environmental Planner shall be notified.
>
> The Pre-Construction Hazardous Materials Assessment may include the following: analysis of subsurface soil samples within the project site for total petroleum hydrocarbons (as gasoline, diesel, and waste oil), Title 22 metals, and volatile organic compounds (VOCs) or any other chemicals of concern to evaluate the

potential presence of contamination; and groundwater samples if subsurface excavations are anticipated to require dewatering. In the case of LBP, the identification, removal, and disposal is regulated under Section 8 California Code of Regulations (CCR) 1532.1.

The results of the Pre-Construction Hazardous Materials Assessment shall be incorporated into the Site Health and Safety Plan prepared in accordance with Mitigation Measure HAZ-1b and the Soil and Groundwater Management Plan prepared in accordance with Mitigation Measure HAZ-1c to determine whether: specific soil and groundwater management and disposal procedures for contaminated materials are required; excavated soils are suitable for reuse; and construction worker health and safety procedures for working with contaminated materials are required. If the pre-construction hazardous materials assessment identifies the presence of soil and/or groundwater contamination at concentrations in excess of applicable regulatory screening levels (Environmental Screening Levels [ESLs] or California human health screening levels [CHHSLs]) for proposed site use, project sponsor or its contractor shall complete site assessment and remedial activities required by the regulatory agency to ensure that residual soil and/or groundwater contamination, if any, shall not pose a continuing significant threat to groundwater resources, human health, or the environment. A copy of the pre-construction hazardous materials assessment shall be submitted to the NPS Senior Environmental Planner for approval.

MM HAZ-1b: Health and Safety Plan. SPAWN shall retain a qualified environmental professional to prepare a site-specific Health and Safety Plan (HASP) in accordance with federal OSHA regulations (29 CFR 1910.120) and Cal/OSHA regulations (8 CCR Title 8, Section 5192). SPAWN shall require the contractor to comply with the HASP. Because anticipated contaminants vary depending upon the location of proposed improvements in the project area and may vary over time, the HASP shall address site-specific worker health and safety issues during construction. The HASP shall include the following information:

1. Results of sampling conducted in accordance with Mitigation Measure HAZ-1a.

2. All required measures to protect construction workers and the general public by including engineering controls, monitoring, and security measures to prevent unauthorized entry to the construction areas and to reduce hazards outside of the construction areas. If prescribed contaminant exposure levels are exceeded, personal protective equipment shall be required for workers in accordance with state and federal regulations.

3. Required worker health and safety provisions for all workers potentially exposed to contaminated materials, in accordance with state and federal worker safety regulations, and designated qualified individual personnel responsible for implementation of the HASP.

SPAWN shall require the contractor to have a site health and safety supervisor fully trained pursuant to hazardous materials regulations be present during excavation, trenching, or cut and fill operations to monitor for evidence of potential soil contamination, including soil staining, noxious odors, debris or buried storage containers. The site health and safety supervisor must be capable of evaluating whether hazardous materials encountered constitute an incidental release of a hazardous substance or an emergency spill. The site health and safety supervisor

shall implement procedures to be followed in the event of an unanticipated hazardous materials release that may impact health and safety. These procedures shall be in accordance with hazardous waste operations and regulations and specifically include, but are not limited to, the following: immediately stopping work in the vicinity of the unknown hazardous materials release; notifying the County of Marin and retaining a qualified environmental firm to perform sampling, remediation, and/or disposal. SPAWN shall provide documentation that HASP measures have been implemented during construction. Submittal of the HASP to the NPS, or any review of the contractor's HASP by NPS, shall not be construed as approval of the adequacy of the contractor as a health and safety professional, the contractor's HASP, or any safety measure taken in or near the construction site. The contractor shall be solely and fully responsible for compliance with all laws, rules, and regulations applicable to health and safety during the performance of the construction work.

A copy of the HASP shall be submitted to the NPS Senior Environmental Planner for approval.

MM HAZ-1c: Soil and Groundwater Management Plan. If ground-borne hazardous materials are identified under the Pre-Construction Hazardous Materials Assessment, prepared in accordance with Mitigation Measure HAZ-1a, SPAWN shall require the construction contractor to prepare and implement a Soil and Groundwater Management Plan, subject to review by the NPS Senior Environmental Planner, that specifies the method for handling and disposal of contaminated soil and groundwater prior to construction. The plan shall include all necessary procedures to ensure that excavated materials and fluids generated during construction are stored, managed, and disposed of in a manner that is protective of human health and in accordance with applicable laws and regulations. The plan shall include the following information:

1. Step-by-step procedures for evaluation, handling, stockpiling, storage, testing, and disposal of excavated material, including criteria for reuse and offsite disposal. All excavated materials shall be inspected prior to initial stockpiling, and spoils that are visibly stained and/or have a noticeable odor shall be stockpiled separately to minimize the amount of material that may require special handling. In addition, excavated materials shall be inspected for buried building materials, debris, and evidence of underground storage tanks; if identified, these materials shall be stockpiled separately and characterized in accordance with landfill disposal requirements. If some of the spoils do not meet the reuse criteria and/or debris is identified, these materials shall be disposed of at a permitted landfill facility.

2. Procedures to be implemented if unknown subsurface conditions or contamination are encountered, such as previously unreported tanks, wells, or contaminated soils.

3. Procedures for containment, handling and disposal of groundwater generated from construction activities, the method to be used to analyze groundwater for hazardous materials likely to be encountered and the appropriate treatment and/or disposal methods.

Though it can reasonably be assumed that project construction planning would include avoidance of overhead electrical power lines, the movement of large

construction equipment and vehicles could damage overhead utility lines and poles. Further, because there may be other underground utility lines (e.g., communication lines) in the project vicinity, project construction could potentially result in disturbance to these lines as well. However, these potential impacts would be reduced to a less-than-significant impact with implementation of **MM HAZ-2**.

MM HAZ-2: SPAWN shall identify underground utility lines such as natural gas, electricity, and water lines that may be encountered during excavation work. Information regarding the size, type, and location of existing utilities will be confirmed by the utility service provider. If such underground utility lines are identified, a plan that outlines construction methods and protective measures to minimize impacts on aboveground and belowground utilities shall be prepared. Construction shall be scheduled to minimize or avoid interruption of utility services to customers. Disconnected utility lines shall be promptly reconnected.

c) **No Impact**. No schools are located within 0.25 miles of the project area. The nearest school is located approximately 3 miles northeast of sites 1 and 3. Therefore, no impact to schools would occur.

d) **No Impact**. A records search of available online databases of hazardous materials sites maintained by the State Water Resources Control Board (SWRCB, 2017) and the Department of Toxic Substances Control (DTSC, 2017) compiled pursuant to Government Code Section 65962.5 did not identify any of the project sites as listed or reveal any listed sites within 0.25 miles of the project area. Therefore, no impact would occur.

e) **No Impact**. The project area is located approximately 12 miles from Marin County Airport otherwise known as Gnoss Field. The project sites are not within the boundaries of the Part 77 Airspace Protection Surfaces as defined in the Airport Land Use Plan for Marin County Airport - Gnoss Field (Cortright & Seibold, 1991). Therefore, no impact would occur.

f) **No Impact**. The project sites are not located within the vicinity of a private airstrip. The nearest private airstrip, the San Rafael airport, is located San Rafael, approximately 12 miles from the Project area. Therefore, no impact would occur.

g) **Less than Significant Impact**. The project would not interfere with the designated agency response or evacuation plan in the event of an emergency because some construction activities would occur on roads not accessible to the public and no roads would be completely closed during project construction. As discussed in Section 16, *Transportation and Circulation* of this Initial Study, traffic control would be implemented to support transport and delivery of heavy equipment, which would reduce potential impacts to emergency access during construction of the project. Because access would be maintained to the site for both emergency and general (public) vehicles and the project would not create any obstructions that would impede access in the event of an emergency, the Project would not impair or interfere with an adopted emergency response plan or emergency evacuation plan.

h) **Less than Significant Impact with Mitigation**. The Association of Bay Area Governments (ABAG) maintains a mapping database that identifies fire-threatened communities located at the wildland-urban interface and indicates wildfire hazards based on the existing fuel/ground cover present in a given area. The project sites are not within a wildland urban interface fire threat area (ABAG, 2017). The California Department of Forestry and Fire Protection (CAL FIRE) has created a severity system to rank fire hazards and examine wildland fire potential across the state. The project area is not within a Moderate, High or Very High Fire Hazard Severity Zone (CAL FIRE, 2007; CAL FIRE, 2008). However, Site 2 is adjacent to a moderate and high severity zone (CAL FIRE 2007).

The project aims to enhance riparian habitat and also is located within a wildland area. Construction activities would occur adjacent to or in the riparian corridor and wildland area, in areas covered with grasses and vegetation that would be susceptible to fire. Potential sources of ignition could include equipment with internal combustion engines and gasoline-powered tools. Smoking by onsite construction personnel would also be a potential source of ignition during construction. **Mitigation Measure HAZ-3** and compliance with any vegetative maintenance for the prevention of wildland fires that the NPS may have would reduce potentially significant impacts associated with fire hazards created during construction to less than significant.

> **MM HAZ-3:** The project sponsor shall ensure that the following fire safety construction practices are implemented:
>
> 1. Earthmoving and portable equipment with internal combustion engines shall be equipped with a sparks arrestor to reduce the potential for igniting a wildland fire;
> 2. Appropriate fire suppression equipment shall be maintained at the construction site;
> 3. Flammable materials shall be removed to a distance of 10 feet from any equipment that could produce a spark, fire, or flame; and
> 4. Construction personnel shall be trained in fire safe work practices, use of fire suppression equipment, and procedures to follow in the event of a fire.

References

ACC Environmental Consultants, Inc., 2015. Hazardous Materials Survey, conducted on October 5, 2015.

Association of Bay Area Governments (ABAG), 2017. Wildland Urban Interface – Fire Threatened Communities, quake.abag.ca.gov/wildfire, accessed May 5, 2017.

California Department of Forestry and Fire Protection (CALFIRE), 2007. Fire Hazard Severity Zones in SRA, adopted by CAL FIRE on November 7, 2007.

CAL FIRE, 2008. Very High Fire Hazard Severity Zones in LRA, published on October 16, 2008.

California Department of Toxic Substances Control (DTSC), 2017. EnviroStor Database search, www.envirostor.dtsc.ca.gov/public, accessed May 4, 2017.

Cortright & Seibold, 1991. Airport Land Use Plan – Marin County Airport Gnoss Field, published on June 10, 1991.

State Water Resources Control Board (SWRCB), 2017. GeoTracker Database search, geotracker.waterboards.ca.gov, accessed May 4, 2017.

4.3.9 Hydrology and Water Quality

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
9.	**HYDROLOGY AND WATER QUALITY — Would the project:**				
a)	Violate any water quality standards or waste discharge requirements?	☐	☒	☐	☐
b)	Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d)	Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on- or off-site?	☐	☐	☒	☐
e)	Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☒	☐	☐
f)	Otherwise substantially degrade water quality?	☐	☒	☐	☐
g)	Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h)	Place within a 100-year flood hazard area structures that would impede or redirect flood flows?	☐	☐	☒	☐
i)	Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☐	☒
j)	Inundation by seiche, tsunami, or mudflow?	☐	☐	☒	☐

Discussion

a, f) **Less than Significant Impact with Mitigation**. Construction of the project would entail excavation, grading, and other earth-disturbing activities that would expose and disturb soils, resulting in the potential for increased erosion by wind or water. Erosion could result in downstream siltation and increase nutrient loading and total suspended solids concentrations in Lagunitas Creek and downstream water bodies (RWQCB, 2015). The installation of Flow Exclusion Areas and possible flow diversion within those areas during construction excavation and grading could affect water quality if discharged improperly. Refueling and use of construction equipment, and other activities have the potential to release pollutants such as fuel, oil and grease, or cleaning solvents that could enter nearby waterways and degrade water quality.

Construction activities shall be required to comply with all RWQCB regulations and procedures for discharging construction-related wastewater. As described in the Chapter 3.1, Soils and Water, SPAWN would be required to comply with **MM HYD-1**, preparation of a Clear-Water Creek Diversions and Construction Flow Diversion Plan. This Plan would be required to receive the approval of the NPS, RWQCB, and CDFW. The requirements of the Plan are described in more detail in the Chapter 3.1, Soils and Water.

MM HYD-1: Clear-Water Creek Diversions and Construction Flow Diversion. The flow diversion area will encompass the minimum area necessary to perform the restoration activity. The period of flow diversion shall extend for the minimum amount of time needed to perform that maintenance activity. Where feasible and appropriate, diversions shall occur via gravity driven systems. Pumped water shall be discharged in conformance with all applicable laws and permit requirements and the channel and banks shall be returned to pre-project condition in those areas affected by diversion structures/activities.

A qualified biologist will be present to ensure that state or federally listed fish and other aquatic vertebrates are not stranded during construction and implementation of channel diversion. Prior to flow diversions, the affected area will be surveyed by a qualified biologist, and if necessary, relocation procedures will be implemented to ensure that state and federally listed fish and other aquatic invertebrates are not adversely affected (outlined in MM BIO-2 and MM BIO-5).

SPAWN shall prepare a Flow Diversion Plan to be approved by the NPS, RWQCB, USFWS, NMFS, and CDFW prior to beginning work. The flow diversion plan shall review all clear-water creek diversions and construction diversion considerations and best management practices described in the Basis of Design Report completed by ESA (2016) and/or any more recent design report completed to date. Examples of required BMPs include the following:

1. Sediment disturbance shall be minimized to the extent feasible during removal of in-water debris or excavation in conjunction with creek restoration.

2. Silt curtains shall be deployed around work activities that may generated significant turbidity.

3. Where flow diversion pumps are required (clear-water gravity diversion shall be the preferred method), intakes shall be screened with less than 5-millimeter mesh screen to prevent other aquatic organisms from entering the pump. In addition, a filtration/settling system shall be included to reduce downstream turbidity (i.e., filter fabric, turbidity curtain). The selection of an appropriate system shall be based on the actual rate of discharge at time of construction.

4. Super sacks (gravel-filled sacks) installed around the flow exclusion area (not to be installed across the entire creek channel) shall be constructed of sandbags or gravel bags secured with polyethylene plastic sheeting; water-filled bladders; interlocking sheet piling; and/or other material. Gravel bags shall be filled with clean river run gravels. Super sacks shall be covered with visqueen to minimize water infiltration. During construction, inspection shall occur daily during the work week. Any gaps, holes, or scour shall be immediately repaired.

5. Water pumped from excavation areas shall not be discharged directly to surface waters without being treated to remove sediments generated during the flow diversion activities.

6. Water outfalls shall be contained within folded and secured filter fabric sediment traps to minimize turbidity to outfall areas.

7. When work is completed, the flow diversion structure shall be removed as soon as possible but no more than 48 hours after work is completed. Impounded water shall be released at a reduced velocity to minimize erosion, turbidity, or harm to downstream habitat. Super sacks shall be removed such that surface elevations of water impounded by the super sacks are lowered at a rate greater than one inch per hour.

Ground disturbance during construction would total 6.03 acres. Because the project would disturb more than one acre, the project would be required to comply with the state Construction General Permit (CGP). The CGP would require the preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) that would include Best Management Practices (BMPs) designed to prevent erosion and control stormwater runoff. These are described in more detail in Chapter 3.1, Soils and Water.

Through compliance with the federal, state, and local regulations and mitigation measures, the proposed project would not significantly degrade water quality, and impacts would be less-than-significant.

b) **Less than Significant Impact**. The project would not substantially deplete groundwater supplies or interfere substantially with groundwater recharge. Given the past land uses at the site, encountering private and public utilities (wells, pumps, communication lines) during construction is possible. At Site 3, there is a possibility of existing utilities (e.g., septic system, water lines, communications lines and electricity), however restoration work in Site 3 would not disturb these lines. Grading and site layout have been designed to avoid or minimize the impact to existing public utilities, including interference with groundwater wells. Additionally, groundwater would not be used during construction; therefore, it could not be depleted. During construction, removal of invasive non-native plant species and replacement with native vegetation could temporarily increase surface water runoff, resulting in less groundwater infiltration, particularly during a rain event. Construction would only last four months, and would occur during the dry season, however, and this is unlikely to occur. Impacts during construction would be less than significant.

During operation, restoration activities, including floodplain enhancements, in-channel enhancements, and vegetation removal and management activities would return drainage to natural conditions. These would decrease surface water runoff over the long term, and increase groundwater infiltration; therefore, impacts would be less than significant.

c) **Less than Significant Impact**. The project would not substantially alter the existing drainage pattern of the work sites in a manner that would result in substantial erosion or siltation on- or off-site. During construction, the project would include grading and excavation activities, which would involve displacement of soils, and erosion during

construction is therefore very likely. The project would be required to comply with the CGP, which would include development and implementation of a SWPPP and BMPs to control erosion and stabilize the construction sites. Through compliance with the CGP, impacts during construction would be less than significant.

In addition, the project would have a beneficial impact on the existing drainage pattern of work sites, such that substantial erosion and siltation on and off-site would be less likely to occur during operation. Biotechnical bank stabilization measures, removal of artificial fill, floodplain enhancements, and vegetation removal and management would restore the project sites to natural conditions, decreasing surface water runoff, increasing groundwater infiltration, and stabilizing banks. Impacts would be less than significant.

d) **Less than Significant Impact**. The project would not substantially alter the existing drainage pattern of work sites or substantially increase the rate of surface runoff in a manner that would result in flooding on- or off-site. As described above, the project could temporarily increase the rate of surface runoff during construction, through removal of invasive vegetation and other enhancements, however, this would be temporary, and would occur during the dry season. Flooding as a result of altered drainage patterns is therefore very unlikely to occur. During construction, impacts would be less than significant.

During operation, the project would decrease the risk of flooding on and off-site. An objective of the project is to restore natural drainage patterns and decrease surface water runoff. Floodplain enhancements including removal of artificial fill, biotechnical bank stabilization measures, and revegetation and maintenance activities would achieve this objective. Revegetation with native plants would particularly improve natural drainage patterns. During operation, the risk of flooding on and off-site due to altered drainage patterns would be less than significant.

e) **Less than Significant Impact with Mitigation**. The project would not create or contribute runoff water that would exceed the capacity of existing or planned storm-water drainage systems, or provide substantial sources of polluted runoff. During construction, the project would require a minimal quantity of water for dust control, the discharge of which would be strictly controlled by compliance with the SWPPP. Project construction therefore would not result in the exceedance of the capacity of such systems and impacts would be less than significant.

The project could result in substantial sources of polluted runoff during construction. Project construction would involve handling of soils at Sites 1 and 2 which may contain lead-based paints (LBP) and asbestos containing materials (ACM). When combined with stormwater or construction water, disruption of contaminated soils could create polluted runoff during construction. As described in Chapter 3.6, Hazardous Materials, the project would be required to comply with **MM HAZ-1a**, Pre-Construction Hazardous Materials Assessment, and **MM HAZ-1c**, Soil and Groundwater Management Plan. The implementation of these mitigation measures would result in identifying the nature and

extent of hazardous materials, if any, and provide the appropriate management procedures to prevent further contamination of the project site. The project would also be required to comply with the CGP to prevent stormwater runoff during construction. Implementation of these mitigation measures and compliance with the CGP would reduce the likelihood of creating a source of polluted runoff to a less than significant level.

During operation, the project would result in a restored creek within the project reach including stabilized slopes, drainage returned to historic patterns, and a significant decrease in artificial fill. These outcomes would decrease surface water runoff and sediment load delivered to streams. Upon project completion, no significant impacts on stormwater runoff would occur.

g) **No Impact**. The proposed project does not include construction of any residential units and therefore, would not place housing within a 100-year flood hazard area. No impacts would occur.

h) **Less than Significant Impact**. The project would not place new structures that would significantly impede or redirect flood flows. Construction would occur during the dry season and would be temporary, lasting only four months, therefore, the likelihood of flood flows occurring during construction is extremely unlikely. Impacts during construction would be less than significant.

Based on the latest FEMA maps, the project reach is within the FEMA designated special flood hazard area subject to inundation by the 1% chance annual flood (100-year storm event), which is confined to the creek channel. No base flood elevations have been defined. There is a detailed flood hazard study for Lagunitas Creek, but it terminates well downstream of the project reach (FEMA, 2009). Removal of fill and remnants of building structures at Sites 1 and 2, combined with creation of new floodplain areas and channel features, would expand the channel geometry and allow flood flows to distribute over a wider area. These enhancements would, at a minimum, maintain existing flood conveyance. Impacts upon completion of the proposed project would be less than significant.

i) **No Impact**. The project would not expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam. The goals of the proposed project are to improve floodplain functions in the project area and reduce impacts of flooding within the watershed.

j) **Less than Significant Impact**. The project would not expose people or structures to a significant risk of inundation by seiche, tsunami or mudflow. The proposed project site is located far from water bodies that would create a seiche or tsunami impacts. Construction would occur during the dry season and for a short period of time; therefore, the potential for risk of inundation by mudflow is unlikely. Impacts during construction would be less than significant.

Upon project completion, steep slopes within the project sites would be stabilized with vegetation management and biotechnical bank stabilization measures. The project would also result in an expanded floodplain area that would accommodate mudflow events by distributing flows over a wider area and decreasing flow velocity.

References

Federal Emergency Management Agency (FEMA), 2009. FIRM GIS layer for Marin County, CA.

San Francisco Bay Regional Water Quality Control Board (RWQCB). 2015. Total Maximum Daily Load (TMDL) for fine sediment in the Lagunitas Creek Watershed and Implementation Plan to Achieve the TMDL and Related Habitat Enhancement Goals. Board Resolution No. R2-2014-0027. Approved by the Office of Administrative Law on March 17, 2015. Available: http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/TMDLs/lagunitascrksedimenttmdl.shtml. Accessed: March 21, 2017.

4.3.10 Land Use and Land Use Planning

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
10.	**LAND USE AND LAND USE PLANNING — Would the project:**				
a)	Physically divide an established community?	☐	☐	☐	☒
b)	Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c)	Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

Discussion

a) **No Impact**. The project would restore habitat and enhance the floodplain in a segment of Lagunitas Creek. Land uses in the vicinity of the project site include parklands, agriculture, and open space. There are few homes in the project vicinity and the density of residential development is very low since the project vicinity is parkland. The restoration work would involve short-term construction impacts. The project does not propose the construction of any new facilities or structures. As a result, the project would be expected to have no impact with respect to physically dividing an established community.

b) **No Impact**. The principal plans, policies, and regulations governing land use in the project vicinity include the *Point Reyes National Seashore General Management Plan, Marin County General Plan* (1980). While the project area resides within the north district of the GGNRA, it is managed by Point Reyes National Seashore. The following objective for the Preservation and Restoration of Natural Resources is relevant to the project:

> To maintain and restore the character of natural environment lands by maintaining the diversity of native park plant and animal life, identifying and protecting threatened and endangered plant and animal species, marine mammals, and other sensitive natural resources, controlling exotic plants, and checking erosion whenever feasible.

The proposed action would improve and restore the natural resources of the parklands and would not construct any new facilities or structures and would therefore be consistent with the General Management Plan and result in no impact.

c) **No Impact**. There are no habitat conservation plans that apply to the project area. The project would, therefore, have no impact with respect to conflicts with an applicable habitat conservation plan or natural community conservation plan.

4.3.11 Mineral Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
11. MINERAL RESOURCES — Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

Discussion

a, b) **No Impact**. The project would use soil readily available onsite and within the region for the enhancement of the riparian area. No significant deposits of mineral resources are present in the project area (DOC, 1983). Additionally, the site does not contain any mineral resource recovery sites that have been delineated on a local plan. Therefore, project implementation would have no impact on a mineral resource recovery site.

References

Department of Conservation (DOC), 1983. Division of Mines and Geology, Mineral Resource Zones and Resource Sectors Marin County, North San Francisco Bay Production-Consumption Region, 1983.

4.3.12 Noise

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
12. NOISE — Would the project result in:				
a) 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?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion

a, d) **Less than Significant Impact**. Restoration activity noise levels at the project site would fluctuate depending on the particular type, number and duration of usage for various pieces of off-road equipment. Restoration activities will begin during the summer months of 2018 and last approximately three mouths. Restoration of Lagunitas Creek would consist of the removal of existing hardscape features, biotechnical bank enhancements, floodplain enhancement, new secondary channel, in-channel enhancements, and vegetation removal. Off-road equipment expected to be used during restoration activities include an excavator, front-end loader and small bulldozer. Representative noise levels for individual equipment are shown in **Table 4-3**.

TABLE 4-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT OPERATIONS

Construction Equipment	Noise Exposure Level, dBA L_{max} @ 50 Feet
Excavator	85
Front End Loader	80
Bulldozer	85

SOURCES: FHWA, 2006.

The operation of each piece of off-road equipment within the project area would not be constant throughout the day, as equipment would be turned off when not in use. Most of

the time over a typical work day, the equipment would be operating at different locations within the project area and would not likely be operating concurrently. However, for a more conservative approximation of restoration noise levels the nearest sensitive receptor would be exposed to, it is assumed for this analysis that two of the loudest construction equipment would be operating at the same time and location within the project area nearest to an offsite sensitive receptor. Using the reference noise levels provided in Table 4-3, a backhoe and excavator running at the same time and location could generate a maximum noise level of 88 dBA from a distance of 50 feet. Therefore, the nearest sensitive receptors located approximately 3,100 feet north-west of the project site could be exposed to a maximum noise level of 43 dBA.

Pursuant to Sections 6.70.030(5) and 6.70.040 of the Marin County Code, hours of construction activities shall be limited to Monday through Friday between the hours of 7:00 a.m. and 6:00 p.m. and Saturdays from 9:00 a.m. to 5:00 p.m. The ordinance also specifies that loud noise-generating construction-related equipment (e.g., backhoes, generators, jackhammers) can be maintained, operated, or serviced at a construction site for permits administered by the Community Development Agency. Limitations to the ordinance may occur for certain emergencies or with written permission.

All restoration activities proposed under the proposed project would comply with Section 6.70.030(5) of the County of Marin Municipal Code by restricting the project construction hours to within the County's allowed construction hours. Since restoration activities would comply with the County's noise standards and would only occur during the daytime hours when ambient noise levels are at their highest, noise generated during the restoration of the Lagunitas Creek would not expose the nearest sensitive receptors to levels in excess of local noise standards or result in a temporary substantial noise increase, resulting in a less than significant impact.

b) **Less than Significant Impact**. Project construction has the potential to result in varying degrees of temporary ground-borne vibration, depending on the specific equipment used and activities involved. All proposed restoration activities would not require the use any construction equipment known to generate significant ground-borne vibration such as impact pile driver or blasting. The off-road equipment that would generate the highest vibration levels would be the operation of a bulldozer during site grading, which can generate vibrations levels as high as 0.089 inches per second PPV (or 87 VdB) from a distance of 25 feet. The nearest residential receptor is located 3,100 feet south-west of the project sites south-west boundary. According to the Federal Transit Administration (FTA) *Guidance Manual for Transit Noise and Vibration Impact Assessment,* the average human's perceptibility of vibration is approximately 65 VdB and human response to vibration is not usually significant unless the vibration exceeds 70 VdB. Because the groundborne vibration at the nearest sensitive receptor would be below the human perception threshold, this impact would be considered less than significant.

c) **No Impact**. The proposed project would not result in long-term operations. Therefore, there would be no substantial permanent increases in ambient noise levels and there would be no impact.

e, f) **No Impact**. The project area is not within an airport land use plan or within 2 miles of a public airport, or within the vicinity of a private airstrip. There would be no exposure to excessive noise levels from aircraft; therefore, no impact would occur.

References

Federal Transit Administration (FTA), 2006. *Transit Noise and Vibration Impact Assessment*. May 2006.

Caltrans, 2013. *Technical Noise Supplement to the Traffic Noise Analysis Protocol*. September 2013.

Federal Highway Administration (FHWA), 2006. Roadway Construction Noise Model User's Guide. January 2006.

4.3.13 Population and Housing

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
13. POPULATION AND HOUSING — Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

a-c) **No Impact**. The project would restore a segment of Lagunitas Creek in the Golden Gate National Recreation Area. Construction of either homes or infrastructure is not proposed as part of the project.

During construction (lasting approximately four months), contractors would be employed at the site. These contracted jobs would not result in long-term employment or population growth and, therefore, would not affect the demand for housing nor the availability of housing in the local area or region. The 32-acre site currently includes riparian habitat and as well as several abandoned residences, old concrete walls and bulkheads, walkways, decks, and other associated hardscape areas at Sites 1 and 2. While there are existing structures on Site 3 being used as office space, these would not be displaced by the implementation of the project. Therefore, the project would not displace or demolish existing housing or displace substantial numbers of people.

While some maintenance would be necessary in the years following restoration to monitor vegetation and site conditions over a period of three to five years, the amount of maintenance work would not cause a substantial increase in demand for long-term employees in the local area or region who would then require housing.

No impact to population and housing would occur as a result of the project.

4.3.14 Public Services

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
14. PUBLIC SERVICES — Would the project:				
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the following public services:				
i) Fire protection?	☐	☐	☐	☒
ii) Police protection?	☐	☐	☐	☒
iii) Schools?	☐	☐	☐	☒
iv) Parks?	☐	☐	☐	☒
v) Other public facilities?	☐	☐	☐	☒

Discussion

a.i - v) **No Impact**. Impacts associated with the provision of government facilities or services can occur when a project increases demand for these facilities or services, usually through increasing the number of people in the same jurisdiction as the project, resulting in the need for additional or expanded facilities, the construction of which could cause significant environmental impacts. The project would restore floodplain geomorphic, hydrologic, and ecological functions at three sites along Lagunitas Creek, and would not construct housing or other facilities that would draw more people to the region surrounding the project area over the long term. Thus, no additional demand would result from the project once construction is complete. Construction activities associated with the restoration, occurring over approximately four months and requiring up to ten workers, would not be expected to create additional demands for fire, police, school, or park facilities, and thus would not result in the need for new government facilities. No governmental facilities are proposed as part of the project, and the project would not physically alter existing governmental facilities. The project would not induce population growth, and would not otherwise affect the ability of existing public facilities to achieve performance objectives. There would be no impact on the provision of the listed public services as a result of the project.

4.3.15 Recreation

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
15. RECREATION:				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a, b) **No Impact**. Physical deterioration of parks or recreation facilities could occur if a project results in population growth that increases use of recreational facilities leading to deterioration of those facilities, or if a project displaces use of recreation uses such that use of other recreation facilities increases substantially and results in deterioration of those facilities. Recreational resources in the region surrounding the project include Golden Gate National Recreation Area (GGNRA), Point Reyes National Seashore, and Samuel P. Taylor State Park. Public entrances to these recreational areas are not located in the vicinity of the project area. While there may be temporary disturbance of some access routes due to overlap with truck haul routes, there are multiple public access routes such that no access point would be overused and thus would not result in physical deterioration of those areas. The GGNRA includes public trails. The Cross Marin Trail runs approximately 250 feet south of the project site and on the south side of Lagunitas Creek and the Jewell Trail is approximately 2,500 feet south of Site 2. There would be no direct effect on trails resulting from the project, nor would the project displace trail use resulting in deterioration of other trail facilities.

Temporary construction impacts related to noise and visual resources would not impact recreationists due to the distance of recreational uses from the site. Further, the project would not result in any loss of recreational uses. Overall, the project would not displace recreational activities to other existing recreation facilities, resulting in deterioration of those other facilities. In addition, the project would not induce population growth and thus not increase the number of people using these recreational areas, requiring the construction of new facilities or the expansion of existing facilities. No recreational facilities are proposed as part of the project. For the reasons set forth above, the project would have no impact on recreational resources.

4.3.16 Transportation and Traffic

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
16. TRANSPORTATION/TRAFFIC — Would the project:				
a) 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?	☐	☒	☐	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

Discussion

a) **Less than Significant Impact with Mitigation**. As discussed below, the project would not significantly conflict with applicable transportation plans or measures and roadways with implementation of **MM TRAF-1 (Traffic Control Plan)**.

Key Access Roadways

Regional access for the project sites would be provided by U.S. Highway 101, and local access for construction-related activities would occur through Sir Francis Drake Boulevard.

Sir Francis Drake Boulevard is an arterial road that runs east-west, connecting Highway 101 to State Route (SR) 1. Sir Francis Drake Boulevard serves as a main route to and from many communities west of SR 1 in Marin County, and in the vicinity of the proposed project, it is a rural two-lane road, which often experiences higher traffic volumes on weekends than on weekdays.

Project Characteristics

There would be no new long-term trips associated with the proposed project, as increased vehicle trips generated by the proposed project would cease when construction is complete. The duration of potentially significant impacts related to short-term disruption

of traffic flow and increased congestion generated by construction vehicles would be limited to the period of time needed to complete construction of the project components. Therefore, the analysis presented herein is focused on the short-term project construction effects.

The level of project-generated truck traffic would vary depending on the nature of the construction activity. Using conservative assumptions that (1) there would be no reuse of excavated soil at Sites 1 and 2, (2) off-hauling of excavated soil from Sites 1 and 2 would each occur over a four-week period, and (3) there would be days when trucks would haul excavated soil from both Sites 1 and 2, the 10-cubic-yard haul trucks would generate up to approximately 142 one-way truck trips per day (i.e., one truck trip every three minutes, spread over the course of an eight-hour day).[9]

Construction crew sizes likewise would vary depending on the construction activity, but would peak at up to 10 workers per day, generating up to approximately 26 one-way vehicle trips per day (20 commute trips plus 6 midday trips [e.g., for lunch]). The great majority of worker trips (commute trips) would not occur at the same time as the above-described truck trips.

Construction-generated traffic increases would be temporary, and therefore, would not result in any long-term degradation in operating conditions on roads used for the project. The primary impact of construction-related traffic would be a temporary and intermittent lessening of the capacities of Sir Francis Drake Boulevard because of the slower movements of construction trucks compared to passenger vehicles. Drivers could experience delay if they were traveling behind a heavy truck. The sequencing of earthwork between Site 1 and Site 2 would be expected to overlap, though not necessarily over the entire four-week period. With implementation of **MM TRAF-1**, potential impacts to traffic flow on area roadways would be less than significant.

> **MM TRAF-1:** SPAWN shall require the construction contractor(s) to hire a qualified traffic engineer to prepare a traffic control plan (TCP) for Sites 1, 2, and 3, in accordance with professional engineering standards, and submit the TCP to the Transportation Authority of Marin for review and approval. The TCP shall be developed on the basis of detailed design plans for the approved project, and shall include, but not necessarily be limited to, the elements listed below:
>
> 1. Schedule grading and excavation activity at Sites 1 and 2 to minimize the overlap of haul truck trips from both sites;
>
> 2. Schedule construction activities to minimize traffic impacts during heavy recreational use periods (e.g., weekends and holidays);

[9] Using the same conservative assumptions about no reuse of excavated soil and the four-week period of off-hauling, the 10-CY trucks would generate an average of approximately 98 and 44 one-way truck trips per day from Site 1 and Site 2, respectively. Those trips would result in one truck trip every five and ten minutes, respectively, over an eight-hour work day.

3. To the extent feasible, reduce truck trips during the peak morning and evening commute hours to minimize adverse impacts on traffic flow;

4. Store all equipment and materials in designated contractor staging areas;

5. Comply with roadside safety protocols to reduce the risk of collisions. Provide "Trucks Entering Roadway" warning signs in advance of project work sites. Train construction personnel to apply appropriate safety measures as described in the traffic control plan.

b) **No Impact**. The level of service standards for roadways that are part of the Marin Congestion Management Program network (e.g., Sir Francis Drake Boulevard) are intended to monitor and address long-term traffic conditions related to future development that generate permanent (on-going) traffic increases, and do not apply to temporary impacts associated with construction projects. Potential impacts associated with the proposed project would be limited to construction activity, which would be transitory in nature, and effects on roadway operations would be temporary. Specifically, increased vehicle trips generated by the proposed project would cease when construction is complete. As such, the proposed project would not exceed level of service standards established by the Transportation Authority of Marin (the county congestion management agency) for designated Congestion Management Program roadways.

c) **No Impact**. The project sites are not located close to any airport, and the proposed project would not intrude into an airport's air space, nor would construction or operation activities affect air traffic patterns; therefore, no impact would occur.

d) **Less than Significant Impact with Mitigation**. The proposed project would not alter the physical configuration of Sir Francis Drake Boulevard, and would not introduce unsafe design features. However, as described in Criterion "a" above, project construction activity would generate haul truck trips, which would introduce potential incompatibility with the existing mix of vehicles on Sir Francis Drake Boulevard. With implementation of **MM TRAF-1** (Traffic Control Plan), potential traffic hazard impacts would be less than significant.

e) **Less than Significant Impact**. The project would not change the configuration of Sir Francis Drake Boulevard, and would not require temporary lane closures. As described in Criterion "a" above, with implementation of **MM TRAF-1**, construction would cause a less-than-significant increase in congestion on area roadways, though heavy construction-related vehicles could interfere with emergency response to the work sites (e.g., emergency service vehicles traveling behind the slow-moving truck). However, in such cases, vehicles are required by law to yield to emergency vehicles that have siren and lights on. Therefore, the proposed project would have a less-than-significant effect on emergency access.

f) **Less than Significant Impact**. The project would neither directly nor indirectly eliminate existing or planned alternative transportation corridors or facilities (e.g., bike paths, lanes, etc.), including changes in polices or programs that support alternative

transportation, nor construct facilities in locations in which future alternative transportation facilities may be planned. The project would not conflict with adopted polices, plans and programs supporting alternative transportation. As described in Criterion "a" above, with implementation of **MM TRAF-1**, construction activities associated with the project would not generate traffic volume increases that would significantly affect traffic flow on area roadways. The performance of public transit, bicycle and pedestrian facilities in the area likewise would not be adversely affected, and the project impact would be less than significant.

4.3.17 Tribal Cultural Resources

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
17. Tribal Cultural Resources — Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☒	☐	☐

Discussion

a, b) **Less than Significant Impact with Mitigation**. Tribal cultural resources are defined as a site feature, place, cultural landscape, sacred place or object, which is of cultural value to a tribe that is either on or eligible for the California Register or a local historic register, or the lead agency, at its discretion, chooses to treat the resource as a tribal cultural resource. Impacts to tribal cultural resources are assessed in consultation with affiliated Native American tribes in accordance with PRC Section 21080.3.

In consultation with the Federated Indians of Graton Rancheria, the NPS determined that there are no tribal cultural resources in the project area (Engel, 2015). While unlikely, there is the potential for the proposed project to encounter previously unidentified archaeological resources and/or human remains, which could be considered tribal cultural resources. Impacts to tribal cultural resources would be potentially significant. As discussed in Chapter 3.5, Cultural Resources of the Environmental Assessment and Section 5 of this Initial Study, **MM-CUL-1** and **MM-CUL-2** would reduce impacts to tribal cultural resources to a less-than-significant level.

> **MM CUL-1:** In the event of any discovery of human remains, archaeological deposits, or any other type of cultural resource during construction, SPAWN shall stop work and the National Park Service archaeological staff shall be notified within 24 hours. Prehistoric archaeological materials might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period materials might include refuse-filled privies or wells. Construction work shall be suspended immediately and shall not resume until the National Park Service re-authorizes project construction. If it is determined that the discovery is eligible for listing in the National Register, and cannot be avoided, the

National Park Service will follow the procedures for Post Review Discoveries 36 CFR 800.13. If human remains are discovered, SPAWN shall implement measure MM CUL-2.

MM CUL-2: In the event of discovery or recognition of any human remains during construction activities, such activities within 100 feet of the find shall cease until the Marin County Coroner has been contacted to determine that no investigation of the cause of death is required. The NPS will be notified in the event of the discovery of human remains. The NPS will follow the procedures for the inadvertent discovery of human remains outlined in 43 CFR 10.4 in compliance with the Native American Graves Protection and Repatriation Act.

References

Engel, Paul, *Removal of Structures at Tocaloma and Jewell, Section 106 Study Report, Point Reyes National Seashore, California*, May 22, 2015.

4.3.18 Utilities and Service Systems

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
18.	**UTILITIES AND SERVICE SYSTEMS — Would the project:**				
a)	Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b)	Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c)	Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d)	Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e)	Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f)	Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g)	Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion

a-c) **No Impact**. The project would not generate any wastewater. As a result, it would not exceed any wastewater treatment requirements, require construction of new wastewater treatment or storm water drainage facilities, or result in the expansion of existing facilities. No impact would occur.

d) **No Impact**. Project construction would not require expanded water entitlements because the project would not need additional water during construction. Expanded entitlements are not required once construction is complete, as no additional water would be needed at the site upon project completion. The project would have no impact to existing water entitlements and resources.

e) **No Impact**. The proposed project would not increase demand associated with wastewater treatment because it would not generate any wastewater. No impact would occur.

f, g) **Less than Significant Impact**. Construction of the project would require the removal and disposal of hardscape features from the project sites such as concrete and other debris (e.g., concrete paths, retaining walls and bulkheads, drainage features, fencing and steps) as well as soil (former fill material that was previously deposited at the project site). The project activities (demolition, floodplain restoration instream features, etc.) would

generate approximately 14,100 cubic yards of material. Approximately 1,000 cubic yards would be reused or redistributed onsite. The remaining 13,100 cubic yards would be hauled offsite for various uses including general fill for nearby construction projects and landfill cover material at the Redwood Landfill in Novato, which has a remaining capacity of 26,000,000 cubic yards and a maximum permitted throughput of 2,300 tons per day (CalRecycle, 2017). Disposal sites would be determined annually and may vary for each construction phase. Off-haul locations would be within 30 miles from the project site.

The project would be required to comply with applicable federal, state, and local statutes and regulations related to solid waste. The impact of solid waste generated by the project would therefore be less than significant.

References

CalRecycle, 2017. Facility/Site Summary Details: Redwood Landfill. Available online at: http://www.calrecycle.ca.gov/SWFacilities/Directory/21-AA-0001/Detail/, accessed May 11, 2017.

4.3.19 Mandatory Findings of Significance

Issues (and Supporting Information Sources):	*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporated*	*Less Than Significant Impact*	*No Impact*
19. MANDATORY FINDINGS OF SIGNIFICANCE —				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☒	☐	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

Discussion

a) **Less than Significant Impact with Mitigation**. The Initial Study checklist identifies potentially significant impacts on the environment related to air quality, biological resources, cultural resources, hazardous materials, hydrology, and transportation. However, mitigation measures have been provided to address these potentially significant impacts. Implementation of the mitigation measures would reduce the impacts to a less than- significant level.

As discussed in Section 4, *Biological Resources*, project impacts on special-status wildlife (e.g., marine mammals, special-status fish and special-status birds) would be reduced with implementation of mitigation measures **MMs BIO-1**, **BIO-2**, **BIO-3**, **BIO-4**, **BIO-5**, **VEG-1**, **VEG-2,** and **VEG-3**. In summary, impacts related to reducing the number or restricting the range of a rare or endangered plant or animal would be less than significant with mitigation.

As discussed in Section 5, *Cultural Resources*, construction activities associated with the project could result in potential impacts on unknown archaeological resources paleontological resources, and human remains. These impacts would be less than significant with implementation of mitigation measures **MMs CUL-1** and **CUL-2**. Therefore, impacts related to elimination of important examples of California history or prehistory would be less than significant with mitigation.

b) **Less than Significant Impact with Mitigation**. Section 15130 of the State CEQA Guidelines requires a reasonable analysis of the significant cumulative impacts of a proposed project. *Cumulative impact* refers to "two or more individual effects that, when

considered together, are considerable or able to compound or increase other environmental impacts." The individual effects may be changes resulting from a single project or an increase in the number of environmental impacts. The cumulative impact is the change in the environment that results when the incremental impact of the project is added to closely-related past, present, or reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects that take place over a period of time (CEQA Guidelines Section 15355 (a)(b)). For the purposes of this project, the geographic context for the project's cumulative impact assessment is generally the vicinity of the Lagunitas Creek. Recently approved and reasonably foreseeable projects and planning efforts in the vicinity of the project site are presented in Chapter 2, Alternatives, Table 2-4.

This initial study determined that the project would have no impact or is not applicable for the following issues: agricultural and forest resources, land use and land use planning, mineral resources, population and housing, public services, and recreation. Therefore, the project would not contribute to cumulative impacts related to these issue areas.

The assessment of potential cumulative impacts for the remaining environmental issue areas is provided in the relevant subsections of Chapter 3, Environmental Consequences. For the reasons described in Chapter 3, with implementation of mitigation measures to address the potential for significant impacts, the proposed project's contribution to all cumulative impacts on the environment would not be cumulatively considerable.

c) **Less than Significant Impact with Mitigation**. The Initial Study Checklist identifies potentially significant impacts related to air quality, biological resources, cultural resources, hazardous materials, hydrology, and transportation. Of these, impacts related to air quality, hazardous materials, and transportation could adversely affect human beings. Mitigation measures have been provided in this initial study to reduce these potentially significant impacts to a less-than-significant level. No significant impacts were identified for the following environmental issue areas: aesthetics; agricultural and forest resources; land use; mineral resources; noise; geology and soils, population and housing; public services; recreation; utilities and service systems. Therefore, with implementation of mitigation measures, the proposed project would not result in substantial adverse effects, direct or indirect, on human beings.

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CHAPTER 5
List of Preparers

5.1 Environmental Science Associates (ESA)

Jill Sunahara, Compliance Project Manager
Erin Higbee-Kollu, CEQA/NEPA Project Manager
Heidi Koenig, Cultural Resources
Stephanie Bishop, Vegetation and Wetlands
Liza Wozniak, Wildlife
Garrett Leidy, Aquatic Wildlife
Tessa Verhoef, Hazardous Materials
Hunter Connell, Hydrology and Geology
Jack Hutchison, Traffic
Stan Armstrong, Air Quality, GHG, Noise
Wes McCullough, GIS, mapping
Jorgen Blomberg, Design Team Director
Jason White, Fluvial Geomorphologist
Scott Stoller, Associate Engineer

5.2 Salmon Protection and Watershed Network (SPAWN)

Preston Brown, Project Sponsor

5.3 National Park Service Reviewers

Brannon Ketcham, Management Assistant
Dave Press, Wildlife Ecologist
Bobbi Simpson, Vegetation Ecologist
Ellen Hamingson, Restoration Biologist
Michael Reichmuth, Fisheries Ecologist

5.4 California State Coastal Conservancy Reviewers

Joel Gerwein, Grant Project Manager

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Appendix A

National Park Service Procedural Manual #77-1: Wetland Protection - Best Management Practices

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Appendix 2: Best Management Practices and Conditions for Proposed Actions with the Potential to Have Adverse Impacts on Wetlands

The following serve as Best Management Practices (BMPs) for NPS actions that may have adverse impacts on wetlands. Additional BMPs may be appropriate depending on local conditions or special circumstances. These also serve as "conditions" that must be met for the actions listed in Section 4.2.1 of these procedures to qualify as "excepted."

1. **Effects on hydrology and fluvial processes:** Action must have only negligible to minor, new adverse effects on site hydrology and fluvial processes, including flow, circulation, velocities, hydroperiods, water level fluctuations, sediment transport, channel morphology, and so on. Care must be taken to avoid any rutting caused by vehicles or equipment.

2. **Effects on fauna:** Action must have only negligible to minor, new adverse effects on normal movement, migration, reproduction, or health of aquatic or terrestrial fauna, including at low flow conditions.

3. **Water quality protection and certification:** Action is conducted so as to avoid degrading water quality to the maximum extent practicable. Measures must be employed to prevent or control spills of fuels, lubricants, or other contaminants from entering the waterway or wetland. Action is consistent with state water quality standards and Clean Water Act Section 401 certification requirements (check with appropriate state agency).

4. **Erosion and siltation controls:** Appropriate erosion and siltation controls must be maintained during construction, and all exposed soil or fill material must be permanently stabilized at the earliest practicable date.

5. **Proper maintenance:** Structure or fill must be properly maintained so as to avoid adverse impacts on aquatic environments or public safety.

6. **Heavy equipment use:** Heavy equipment use in wetlands must be avoided if at all possible. Heavy equipment used in wetlands must be placed on mats, or other measures must be taken to minimize soil and plant root disturbance and to preserve preconstruction elevations.

7. **Stockpiling material:** Whenever possible, excavated material must be placed on an upland site. However, when this is not feasible, temporary stockpiling of excavated material in wetlands must be placed on filter cloth, mats, or some other semipermeable surface, or comparable measures must be taken to ensure that underlying wetland habitat is protected. Runoff from stockpiled material must be controlled with silt fencing, filter cloth, coir wattles or other appropriate means to prevent reentry into the waterway or wetland.

8. **Removal of stockpiles and other temporary disturbances during construction:** Temporary stockpiles in wetlands must be removed in their entirety as soon as practicable. Wetland areas temporarily disturbed by stockpiling or other activities during construction must be returned to their pre-existing elevations, and soil, hydrology, and native vegetation communities must be restored as soon as practicable.

9. **Topsoil storage and reuse:** Revegetation of disturbed soil areas should be facilitated by salvaging and storing existing topsoil and reusing it in restoration efforts in accordance with NPS policies and guidance. Topsoil storage must be for as short a time as possible to prevent loss of seed and root viability, loss of organic matter, and degradation of the soil microbial community.

10. **Native plants:** Where plantings or seeding are required, native plant material must be obtained and used in accordance with NPS policies and guidance. Management techniques must be implemented to foster rapid development of target native plant communities and to eliminate invasion by exotic or other undesirable species.

11. **Boardwalk elevations:** Minimizing shade impacts, to the extent practicable, should be a consideration in designing boardwalks and similar structures. (Placing a boardwalk at an elevation above the vegetation surface at least equal to the width of the boardwalk is one way to minimize shading.)

12. **Wild and Scenic Rivers:** If the action qualifies as a water resources project pursuant to Section 7(a) of the Wild and Scenic Rivers Act, then appropriate project review and documentation requirements under Section 7(a) are required.

13. **Coastal zone management:** Action must be consistent, to the maximum extent practicable, with state coastal zone management programs.

14. **Endangered species:** Action must not jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, including degradation of critical habitat (see *NPS Management Policies 2006* and guidance on threatened and endangered species).

15. **Historic properties:** Action must not have adverse effects on historic properties listed or eligible for listing in the National Register of Historic Places.

Appendix B
Scoping Comments

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April 24, 2017

Dear Park Service:

I am in full agreement with the process of removing the cabins in Jewel and Tocaloma and also eliminating the berms and levys that inhibited the flow of the main creek bed and streams that feed into the main stem.

I am hoping that we can involve the public as much as possible in the rehabilitation of Lagunitas creek by people,

through the internet and media (news papers, T.V., radio etc.) to get as many young people and children involved as possible to take pride and responsibility for this project.

I work as a volunteer with not only Golden Gate National Recreation Park but also Point Reyes National Seashore and watch children as well as adults take delight in the experience of hands on work with nature especially those who live nearby and can appreciate the love and delight we share in helping nature thrive around us.

Thank You for this wonderful project!

Walter Hoffman
Bolinas

Marin Audubon Society

P.O. Box 599 | Mill Valley, CA 94942-0599 | marinaudubon.org

April 27, 2017

Lagunitas Overwinter EA
Cicily Muldoon, Superintendent
Pt. Reyes National Seashore
1 Bear Valley Road
Pt. Reyes Station, CA 94956

Dear Ms. Muldoon:

Thank you for the opportunity to comment on the riparian and enhancement project'.
As described in the notice, the project will consist of widening the creek and extending the floodplain by removing fill and retaining walls, excavating selective side channels and the placement of woody debris. As the primary Coho salmon habitat, a successful restoration/enhancement project such as this would be a great benefit to these and the many other species that depend on the creek. We have just several points:

The project will remove structures associated with an historic housing development. It would be helpful if these were marked on the site plan attached with the notice... It is unclear whether any of the structures shown on Figure 1 would be removed. We recall from the presentation at the Lagunitas Technical Advisory Committee meeting that the structures being removed were unoccupied and dilapidated. We suggest that a goal be the removal of all of the structures, unoccupied/abandoned and currently occupied structures, on federal lands and that the creek be restored in these areas. Should there be insufficient funds to remove them now, we suggest that additional funds be sought for later removal. The creek should not be restricted because there are buildings on public lands that are in use. Habitat restoration should be the primary use for public lands.

We also suggest that the project proponents continue to make presentations at the Lagunitas Technical Advisory Committee as the design becomes more specific. The past presentation was helpful and we expect future input would be similarly constructive..
Thanks for considering our comments.

Sincerely,

Barbara Salzman, Co-chair
Conservation Committee

Phil Peterson, Co-chair
Conservation Committee

United States Department of the Interior

NATIONAL PARK SERVICE
Point Reyes National Seashore
Point Reyes, California 94956

IN REPLY REFER TO:

L7617

MAR 24 2017

Notice of Scoping: Lagunitas Creek-Tocaloma/Jewell Floodplain and Riparian Enhancement Project

Dear Interested Party:

The Salmon Protection and Watershed Network (SPAWN) has proposed extensive floodplain restoration and riparian habitat enhancement on National Park Service lands in the Jewell and Tocaloma areas of Lagunitas Creek. This reach of Lagunitas Creek has been identified as an opportunity to restore high value off channel habitat for juvenile salmonids. In addition, modifications to and enhancement of the floodplain can be expected to improve geomorphic function and channel form within the creek. Significant areas of floodplain that can provide crucial habitat for coho and other salmonids when restored exist within the identified study area.

In accordance with the National Environmental Policy Act, the SPAWN is beginning preparation of an Environmental Assessment for the National Park Service. The 30-day scoping period for the public to comment on the proposed activities will end on **Monday, April 24, 2017.**

Scoping is the first step to involve the public in the NEPA process. The objective is to engage agencies, organizations, and the public early in the EA development process to receive input on the proposed action, to identify environmental issues that should be addressed in the EA, potential alternatives, and sources of data that should be considered. Scoping allows agency and public concerns to be identified early and helps focus the analysis on important issues.

Proposed Action
SPAWN proposes to enhance natural hydrological processes and riparian habitat complexity within the mile-long riparian corridor encompassing all developed sites within the Jewell and Tocaloma reach within Lagunitas Creek. Implementation of the proposed project would promote the formation of more frequently active side channels and floodplain areas, features that would provide additional critical winter habitat for juvenile coho salmon and steelhead, while improving sediment metering and sorting, and water quality conditions.

The primary method proposed for modifying creek hydrology is to remove fill, concrete retaining walls, and bulkheads from the floodplain, associated with the historic housing development, and excavate selective side channel and alcove features adjacent to the main

stem that would be activated over a range of stream flows. Additionally, creek hydrology would be encouraged to inundate floodplain areas and excavated side channels through the installation of engineered woody debris structures (LWD) in the main channel and floodplain areas to help spread the flows out across the floodplain while deflecting flows into the excavated floodplain side channels and alcoves on a more frequent basis (flows between 50 and 150 cubic feet per second, approximately). The side channels and alcoves would include the installation of LWD structures to add cover and habitat complexity for salmonids and provide hydraulic controls to maintain intended hydrologic and geomorphic function. Another result of the project will be to reduce the channel slope, through the project area and spread flows across the valley floor. This would distribute the energy of the flow over a broader area, reducing stress on the stream bed, and reducing stream bed mobility and bed scour. The large wood structures and floodplain channel features will sort, meter, and store fine sediment, particularly in the floodplain, thereby substantially enhancing the stream in the main channel.

The furthest downstream site at the existing TIRN/SPAWN offices would also see the realignment of a tributary stream that was relocated to flow away from the historic housing development and lost its natural connection to Lagunitas Creek through the installation of a fill and containment berms. The tributary stream would be reconnected with Lagunitas Creek through the removal of the berm and excavation of a new channel. Passive loading of wood in the riparian corridor through the mile-long project area would also be done to facilitate natural requirement of wood into the channel over a range of flows. These wood pieces would be placed along the channel using heavy equipment and would be recruited into the channel over time. Revegetation using native materials and local genetic plant stock would be done across the entire mile-long corridor, with heavy seeding, planting, and biotechnical treatments done at graded sites to stabilize slopes, side channel, alcoves, and floodplain areas. Non-native invasive plants including Himalayan blackberry, poison hemlock, and Japanese Knotweed would be removed through manual treatments throughout the mile-long corridor and mature native conifer and hardwood trees would be planted in the corridor to increase wood volumes in the channel over time and provide habitat to native riparian species.

Project construction would occur during the late summer and early fall months (August – October) to work outside of the sensitive bird nesting or salmonid spawning seasons. The Phase I (sites 1, and 2) would be constructed in 2018 with the Phase II (site 3) constructed when the NPS and SPAWN determine the office buildings are no longer suitable for occupancy.

SPAWN received funding from the California Department of Fish and Wildlife in 2014 to conduct a feasibility study of the restoration opportunities at the site, and received funding from the State Coastal Conservancy in 2016 to complete engineering designs, permitting, and state and federal compliance documents. The impacts analysis focuses on the mile-long stretch of Lagunitas Creek, including Tocaloma and Jewell, located entirely within the Golden Gate National Recreation Area. This NPS jurisdiction requires NPS review and approval. The CEQA analysis will be completed in an Initial Study as part of the cumulative impact analysis.

How to Comment
The 30-day comment period will close on April 24, 2017. You are encouraged to participate by submitting comments online or by letter. The preferred method for submitting comments is via the internet through the NPS Planning, Environment and Public Comment site at http://parkplanning.nps.gov/pore. From the main page, click on the "SPAWN Lagunitas Tocaloma/Jewell Floodplain and Riparian Enhancement Project" and then click the "Open for Comment" project link on the left column of the page to comment. You may also mail or hand deliver comments to the "SPAWN Lagunitas Project Scoping" c/o Superintendent, Point Reyes National Seashore, 1 Bear Valley Road, Point Reyes Station, CA 94956. The end of the comment period is Monday, **April 24, 2017**.

Comments will not be accepted by FAX, email, or in any other way than those specified above. Bulk comments in any format (hard copy or electronic) submitted on behalf of others will not be accepted. Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment – including your personal identifying information – may be made publically available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Project Timeline
March 24, 2017: Public Scoping Period
Fall 2017: Release EA for public review and comment
Winter 2017/18: planning process complete
Summer 2018: Restoration activities begin.

If you have any questions, please contact John Dell'Osso, Chief of Interpretation and Education at 415-464-5135, or John_A_Dell'Osso@nps.gov. We appreciate your participation in this process.

Sincerely,

Cicely A. Muldoon
Superintendent

Enclosures:
- Project Summary
- Site Map

Proposed Project Summary:
Lagunitas Creek-Tocaloma/Jewell Floodplain and Riparian Enhancement Project

Summary

The Salmon Protection and Watershed Network (SPAWN) has proposed extensive floodplain restoration and riparian habitat enhancement on National Park Service lands in the Jewell and Tocaloma areas of Lagunitas Creek. This reach of Lagunitas Creek has been identified as an opportunity to restore high value off channel habitat for juvenile salmonids. In addition, modifications to and enhancement of the floodplain can be expected to improve geomorphic function and channel form within the creek. Significant areas of floodplain that can provide crucial habitat for coho and other salmonids when restored exist within the identified study area.

Need for Action

The Lagunitas Creek Watershed is designated as critical habitat for the coho salmon (Onchorynchus kisutch) and steelhead trout (O. mykiss) listed under the Endangered Species Act as endangered and threatened, respectively, by the National Marine Fisheries Service. Coho and steelhead are both anadromous salmonids that occupy coastal California streams from parts of southern California up into Oregon. Both species have declined significantly throughout their range in California compared to historic numbers (Stillwater Sciences 2008, NMFS 2012 and 2015) with coho in central California considered to be on the verge of extinction (NMFS 2012). Lagunitas Creek represents one of the largest and most stable populations of coho salmon throughout the state. The steelhead population in Lagunitas Creek is considered to be an essential population for the recovery of steelhead in central California (Stillwater Sciences 2008, NMFS 2015). In addition, Lagunitas Creek supports a robust population of the federally listed endangered California freshwater shrimp (Syncaris pacifica). Of the roughly 20 streams known to support California freshwater shrimp throughout its limited range of only Marin, Sonoma, and Napa Counties, Lagunitas Creek has been the highest rated stream for its abundance and distribution of shrimp (USFWS 1998). It is also the only stream where the shrimp occur on protected lands.

Based on extensive scientific literature regarding the conditions and life history needs of salmonids in Laguntias Creek, and on goals outlined in planning documents of the National Park Service (NPS), SPAWN has recognized the rare opportunity to restore critical off-channel floodplain habitats and assist NPS with implementation of park facilities plans for the benefit of coho salmon, steelhead, California freshwater shrimp, and other aquatic species in Lagunitas Creek.

Project Location

Lagunitas Creek is located in western Marin County, with a significant portion of the lower part of the creek flowing through NPS lands within the Golden Gate National Recreation Area and Point Reyes National Seashore. The creek stretches approximately 22 miles from its headwaters on Mt. Tamalpais to its mouth at the tidal estuary wetlands located at the southeast end of Tomales Bay.

SPAWN received funding from the California Department of Fish and Wildlife in 2014 to conduct a feasibility study of the restoration opportunities at the site, and received funding from the State Coastal Conservancy in 2016 to complete engineering designs, permitting, and state and federal compliance documents. The impacts analysis focuses on the mile-long stretch of Lagunitas Creek, including Tocaloma and Jewell, located entirely within the Golden Gate National Recreation Area. This NPS jurisdiction requires NPS review and approval. The CEQA analysis will be completed in the forthcoming IS as part of the cumulative impact analysis.

Background

The project site is located in Marin County, at river mile 6.4 (approximately) of Lagunitas Creek, measured from the Highway 1 Bridge in Point Reyes Station. The downstream limit of the project area is

the Turtle Island Network/Salmon Protection and Watershed Network (SPAWN) office and extends upstream approximately 4,500 feet to the border of Samuel P. Taylor State Park.

Summer homes were built in the Jewell and Tocaloma areas beginning in 1934 on the land between Sir Francis Drake Blvd and Lagunitas Creek. The properties were transformed the natural site conditions, including alterations to the creek and floodplain, and placement of roughly 150,000 cubic yards of fill across these properties (ESA & SPAWN 2016). The NPS acquired most of these properties in the early 1980s, and the Reservations of Use expired in the early 2000s. In 2005, many of these structures were flooded by Lagunitas Creek. In 2016, the NPS removed hazardous and abandoned residential structures from 7 of the properties in Jewell and Tocaloma.

The project reach has several old concrete retaining walls and bulkheads, walkways, decks, and other associated hard-scape areas. These features have increased and modified local runoff, reduced infiltration and disrupted natural hydrologic and geomorphic processes. Over time, non-native vegetation has established throughout the parcels, compromising the extents and density of native vegetation, thereby degrading terrestrial and aquatic habitat values.

Functioning floodplains provide critical rearing habitat during typical seasonal flows and also provide high flow refugia during high flow storm events. Previous studies of the Lagunitas Creek watershed have documented winter habitat as the limiting factor for both coho salmon and steelhead. Both juvenile coho salmon and steelhead suffer the most concentrated population declines between fall and spring annually, with coho declines being the most dramatic.

Proposed Action

SPAWN proposes to enhance natural hydrological processes and riparian habitat complexity within the roughly mile-long riparian corridor encompassing all developed sites within the Jewell and Tocaloma reach within Lagunitas Creek. Implementation of the proposed project would promote the formation of more frequently activated side channels and floodplain areas, features that would provide additional critical winter habitat for juvenile coho salmon and steelhead, while improving sediment metering and sorting, and water quality conditions.

The primary method proposed for modifying creek hydrology is to remove fill, concrete retaining walls, and bulkheads from the floodplain, associated with the historic housing development, and excavate selective side channel and alcove features adjacent to the main stem that would be activated over a range of stream flows. Additionally, creek hydrology would be encouraged to inundate floodplain areas and excavated side channels through the installation of engineered woody debris structures (LWD) in the main channel and floodplain areas to help spread the flows out across the floodplain while deflecting flows into the excavated floodplain side channels and alcoves on a more frequent basis (flows between 50 and 150 cubic feet per second, approximately). The side channels and alcoves would include the installation of LWD structures to add cover and habitat complexity for salmonids and provide hydraulic controls to maintain intended hydrologic and geomorphic function. Another result of the project will be to reduce the channel slope, through the project area and spread flows across the valley floor. This would distribute the energy of the flow over a broader area, reducing stress on the stream bed, and reducing stream bed mobility and bed scour. The large wood structures and floodplain channel features will sort, meter, and store fine sediment, particularly in the floodplain, thereby substantially enhancing the stream in the main channel.

The furthest downstream site at the existing TIRN/SPAWN offices would also see the realignment of a tributary stream that was relocated to flow away from the historic housing development and lost its natural connection to Lagunitas Creek through the installation of a fill and containment berms. The tributary stream would be reconnected with Lagunitas Creek through the removal of the berm and

excavation of a new channel. Passive loading of wood in the riparian corridor through the mile-long project area would also be done to facilitate natural requirement of wood into the channel over a range of flows. These wood pieces would be placed along the channel using heavy equipment and would be recruited into the channel over time. Revegetation using native materials and local genetic plant stock would be done across the entire mile-long corridor, with heavy seeding, planting, and biotechnical treatments done at graded sites to stabilize slopes, side channel, alcoves, and floodplain areas. Non-native invasive plants including Himalayan blackberry, poison hemlock, and Japanese Knotweed would be removed through manual treatments throughout the mile-long corridor and mature native conifer and hardwood trees would be planted in the corridor to increase wood volumes in the channel over time and provide habitat to native riparian species.

Project construction would occur during the late summer and early fall months (August – October) to work outside of the sensitive bird nesting or salmonid spawning seasons. The Phase I (sites 1, and 2) would be constructed in 2018 with the Phase II (site 3) constructed when the NPS and SPAWN determine the office buildings are no longer suitable for occupancy.

References

Environmental Science Associates and Salmon Protection and Watershed Network 2016. Lagunitas Creek Floodplain and Riparian Enhancement Project. Feasibility Study. California Department of Fish and Wildlife. March 2016.

Stillwater Sciences 2008. Limiting Factors Analysis, Limiting Factors for Coho Salmon and Steelhead. Prepared for Marin Conservation District. Stillwater Sciences. March 2008.

National Marine Fisheries Service (NMFS). 2012. Final Recovery Plan for Central California Coast coho salmon Evolutionarily Significant Unit. National Marine Fisheries Service, Southwest Region, Santa Rosa, California.

National Marine Fisheries Service (NMFS). 2015. Public Draft Coastal Multispecies Recovery Plan. National Marine Fisheries Service, West Coast Region, Santa Rosa, California.

U.S. Fish and Wildlife Service (USFWS). 1998. California Freshwater Shrimp (Syncaris pacifica Holmes) Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon 94 pp.

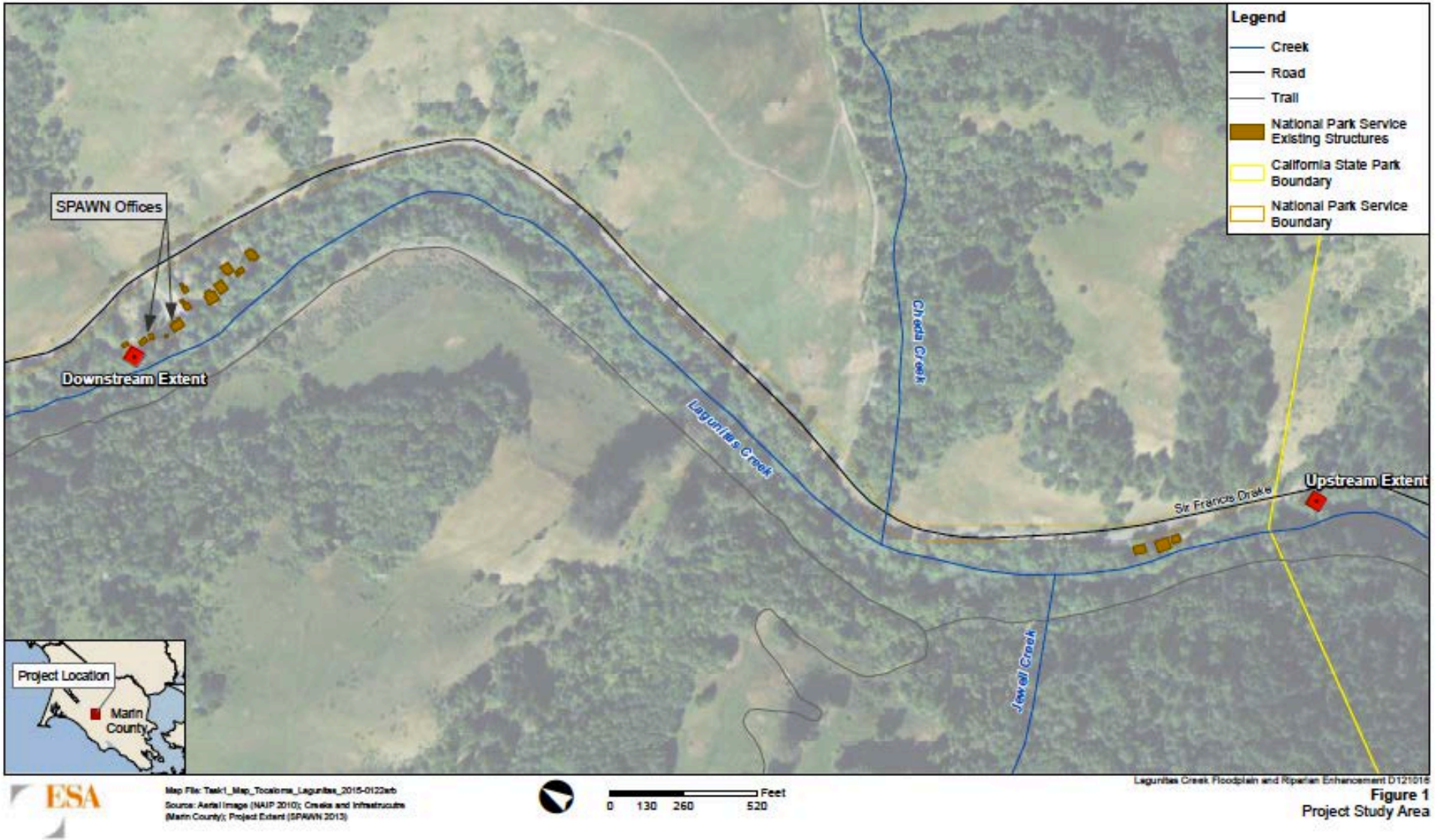

Figure 1: Site map showing the project area, with SPAWN offices at the downstream extent and the boarder with Samuel P. Taylor State Park at the upstream extent.

Appendix C
Air Quality Data

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Lagunitas Creek Flood Riparian Enhancement

Marin County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	6.30	Acre	6.30	274,428.00	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	69
Climate Zone	5			**Operational Year**	2019
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Restoration phase schedule provided by Jorgen Blomber ESA May 10, 2017.

Off-road Equipment -

Trips and VMT - Assumed 970 haul trips from site 1 and 400 haul trips from site 2.

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Off-road Equipment - Assumed construction equipment

Construction Off-road Equipment Mitigation - Engine Tier 3 Mitigation

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tblConstructionPhase	PhaseEndDate	6/21/2018	8/17/2018
tblConstructionPhase	PhaseEndDate	7/19/2018	8/24/2018
tblConstructionPhase	PhaseStartDate	7/7/2017	7/9/2018
tblConstructionPhase	PhaseStartDate	7/28/2017	7/16/2018
tblConstructionPhase	PhaseStartDate	7/20/2018	7/30/2018
tblConstructionPhase	PhaseStartDate	8/17/2018	8/20/2018
tblConstructionPhase	PhaseStartDate	8/31/2018	8/27/2018
tblConstructionPhase	PhaseStartDate	8/18/2017	7/9/2018
tblConstructionPhase	PhaseStartDate	11/10/2017	7/16/2018
tblConstructionPhase	PhaseStartDate	1/26/2018	7/16/2018
tblConstructionPhase	PhaseStartDate	4/13/2018	7/23/2018
tblConstructionPhase	PhaseStartDate	5/11/2018	7/23/2018
tblConstructionPhase	PhaseStartDate	5/25/2018	7/23/2018
tblConstructionPhase	PhaseStartDate	6/22/2018	7/30/2018
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition1
tblOffRoadEquipment	PhaseName		Site Preparation9

tblOffRoadEquipment	PhaseName		Site Preparation8
tblOffRoadEquipment	PhaseName		Site Preparatino10
tblOffRoadEquipment	PhaseName		Site Preparation1
tblOffRoadEquipment	PhaseName		Site Preparation2
tblOffRoadEquipment	PhaseName		Site Preparation3
tblOffRoadEquipment	PhaseName		Site Preparation4
tblOffRoadEquipment	PhaseName		Site Preparation5
tblOffRoadEquipment	PhaseName		Site Preparation6
tblOffRoadEquipment	PhaseName		Site Preparation7
tblOffRoadEquipment	PhaseName		Demolition2
tblProjectCharacteristics	OperationalYear	2018	2019
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripLength	20.00	30.00
tblTripsAndVMT	HaulingTripNumber	0.00	970.00
tblTripsAndVMT	HaulingTripNumber	0.00	400.00
tblTripsAndVMT	WorkerTripNumber	20.00	8.00

tblTripsAndVMT	WorkerTripNumber	25.00	8.00
tblTripsAndVMT	WorkerTripNumber	15.00	8.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.2645	2.9570	1.6146	3.3700e-003	0.9304	0.1391	1.0695	0.5039	0.1280	0.6319	0.0000	313.0667	313.0667	0.0751	0.0000	314.9429
Maximum	**0.2645**	**2.9570**	**1.6146**	**3.3700e-003**	**0.9304**	**0.1391**	**1.0695**	**0.5039**	**0.1280**	**0.6319**	**0.0000**	**313.0667**	**313.0667**	**0.0751**	**0.0000**	**314.9429**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	0.0759	1.5267	1.7365	3.3700e-003	0.9304	0.0602	0.9905	0.5039	0.0601	0.5640	0.0000	313.0664	313.0664	0.0751	0.0000	314.9426
Maximum	**0.0759**	**1.5267**	**1.7365**	**3.3700e-003**	**0.9304**	**0.0602**	**0.9905**	**0.5039**	**0.0601**	**0.5640**	**0.0000**	**313.0664**	**313.0664**	**0.0751**	**0.0000**	**314.9426**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**71.30**	**48.37**	**-7.55**	**0.00**	**0.00**	**56.75**	**7.38**	**0.00**	**53.06**	**10.75**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
5	7-7-2018	9-30-2018	2.9445	1.4582
		Highest	2.9445	1.4582

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.5900e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1000e-004	1.1000e-004	0.0000	0.0000	1.2000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0141	0.0486	0.1607	4.7000e-004	0.0403	6.1000e-004	0.0409	0.0108	5.8000e-004	0.0114	0.0000	43.0709	43.0709	1.6200e-003	0.0000	43.1114
Waste						0.0000	0.0000		0.0000	0.0000	0.1096	0.0000	0.1096	6.4800e-003	0.0000	0.2716
Water						0.0000	0.0000		0.0000	0.0000	0.0000	7.6429	7.6429	3.5000e-004	7.0000e-005	7.6728
Total	**0.0167**	**0.0486**	**0.1608**	**4.7000e-004**	**0.0403**	**6.1000e-004**	**0.0409**	**0.0108**	**5.8000e-004**	**0.0114**	**0.1096**	**50.7139**	**50.8235**	**8.4500e-003**	**7.0000e-005**	**51.0559**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	2.5900e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1000e-004	1.1000e-004	0.0000	0.0000	1.2000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0141	0.0486	0.1607	4.7000e-004	0.0403	6.1000e-004	0.0409	0.0108	5.8000e-004	0.0114	0.0000	43.0709	43.0709	1.6200e-003	0.0000	43.1114
Waste						0.0000	0.0000		0.0000	0.0000	0.1096	0.0000	0.1096	6.4800e-003	0.0000	0.2716
Water						0.0000	0.0000		0.0000	0.0000	0.0000	7.6429	7.6429	3.5000e-004	7.0000e-005	7.6728
Total	**0.0167**	**0.0486**	**0.1608**	**4.7000e-004**	**0.0403**	**6.1000e-004**	**0.0409**	**0.0108**	**5.8000e-004**	**0.0114**	**0.1096**	**50.7139**	**50.8235**	**8.4500e-003**	**7.0000e-005**	**51.0559**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Lagunitas Creek Flood Riparian Enhancement - Marin County, Annual

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition1	Demolition	7/9/2018	7/27/2018	5	15	
2	Site Preparation1	Site Preparation	7/9/2018	9/28/2018	5	60	
3	Demolition2	Demolition	7/16/2018	8/3/2018	5	15	
4	Site Preparation2	Site Preparation	7/16/2018	9/28/2018	5	55	
5	Site Preparation3	Site Preparation	7/16/2018	9/28/2018	5	55	
6	Site Preparation4	Site Preparation	7/23/2018	8/17/2018	5	20	
7	Site Preparation5	Site Preparation	7/23/2018	8/3/2018	5	10	
8	Site Preparation6	Site Preparation	7/23/2018	8/17/2018	5	20	
9	Site Preparation7	Site Preparation	7/30/2018	8/24/2018	5	20	
10	Site Preparation8	Site Preparation	7/30/2018	8/24/2018	5	20	
11	Site Preparation9	Site Preparation	8/20/2018	8/31/2018	5	10	
12	Site Preparatino10	Site Preparation	8/27/2018	9/7/2018	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation1	Excavators	1	8.00	158	0.38
Site Preparation1	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation1	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Demolition1	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Demolition1	Excavators	1	8.00	158	0.38
Site Preparation9	Excavators	1	8.00	158	0.38
Site Preparation2	Excavators	1	8.00	158	0.38
Site Preparation2	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation3	Excavators	1	8.00	158	0.38
Site Preparation3	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation3	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Demolition2	Excavators	1	8.00	158	0.38
Demolition2	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation4	Excavators	1	8.00	158	0.38
Site Preparation4	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation4	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation5	Excavators	1	8.00	158	0.38
Site Preparation5	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation5	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation6	Excavators	1	8.00	158	0.38
Site Preparation6	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation6	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation7	Excavators	1	8.00	158	0.38
Site Preparation7	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation7	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation8	Excavators	1	8.00	158	0.38
Site Preparation8	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation8	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Site Preparation9	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparation9	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Site Preparatino10	Excavators	1	8.00	158	0.38
Site Preparatino10	Rubber Tired Dozers	1	8.00	247	0.40
Site Preparatino10	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation1	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Demolition1	8	8.00	0.00	970.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation2	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation3	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Demolition2	6	8.00	0.00	400.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation4	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation5	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation6	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation7	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation8	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparation9	10	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT
Site Preparatino10	3	8.00	0.00	0.00	10.80	6.60	30.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Clean Paved Roads

3.2 Demolition1 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.1600e-003	0.0429	0.0421	6.0000e-005		2.5200e-003	2.5200e-003		2.3200e-003	2.3200e-003	0.0000	5.6633	5.6633	1.7600e-003	0.0000	5.7074
Total	**4.1600e-003**	**0.0429**	**0.0421**	**6.0000e-005**		**2.5200e-003**	**2.5200e-003**		**2.3200e-003**	**2.3200e-003**	**0.0000**	**5.6633**	**5.6633**	**1.7600e-003**	**0.0000**	**5.7074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.0800e-003	0.2176	0.0674	5.6000e-004	0.0122	9.9000e-004	0.0132	3.3600e-003	9.5000e-004	4.3100e-003	0.0000	54.8778	54.8778	3.0700e-003	0.0000	54.9545
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.8000e-004	1.7800e-003	0.0000	4.7000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4486	0.4486	1.0000e-005	0.0000	0.4489
Total	**7.3300e-003**	**0.2178**	**0.0692**	**5.6000e-004**	**0.0127**	**9.9000e-004**	**0.0137**	**3.4900e-003**	**9.5000e-004**	**4.4400e-003**	**0.0000**	**55.3263**	**55.3263**	**3.0800e-003**	**0.0000**	**55.4034**

3.2 Demolition1 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.5200e-003	0.0314	0.0470	6.0000e-005		1.8000e-003	1.8000e-003		1.8000e-003	1.8000e-003	0.0000	5.6633	5.6633	1.7600e-003	0.0000	5.7074
Total	**1.5200e-003**	**0.0314**	**0.0470**	**6.0000e-005**		**1.8000e-003**	**1.8000e-003**		**1.8000e-003**	**1.8000e-003**	**0.0000**	**5.6633**	**5.6633**	**1.7600e-003**	**0.0000**	**5.7074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	7.0800e-003	0.2176	0.0674	5.6000e-004	0.0122	9.9000e-004	0.0132	3.3600e-003	9.5000e-004	4.3100e-003	0.0000	54.8778	54.8778	3.0700e-003	0.0000	54.9545
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.8000e-004	1.7800e-003	0.0000	4.7000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4486	0.4486	1.0000e-005	0.0000	0.4489
Total	**7.3300e-003**	**0.2178**	**0.0692**	**5.6000e-004**	**0.0127**	**9.9000e-004**	**0.0137**	**3.4900e-003**	**9.5000e-004**	**4.4400e-003**	**0.0000**	**55.3263**	**55.3263**	**3.0800e-003**	**0.0000**	**55.4034**

3.3 Site Preparation1 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1807	0.0000	0.1807	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0516	0.5486	0.2997	5.0000e-004		0.0284	0.0284		0.0261	0.0261	0.0000	46.0632	46.0632	0.0143	0.0000	46.4217
Total	**0.0516**	**0.5486**	**0.2997**	**5.0000e-004**	**0.1807**	**0.0284**	**0.2091**	**0.0993**	**0.0261**	**0.1255**	**0.0000**	**46.0632**	**46.0632**	**0.0143**	**0.0000**	**46.4217**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-003	7.4000e-004	7.1100e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.2000e-004	0.0000	1.7943	1.7943	5.0000e-005	0.0000	1.7956
Total	**1.0000e-003**	**7.4000e-004**	**7.1100e-003**	**2.0000e-005**	**1.8900e-003**	**1.0000e-005**	**1.9000e-003**	**5.0000e-004**	**1.0000e-005**	**5.2000e-004**	**0.0000**	**1.7943**	**1.7943**	**5.0000e-005**	**0.0000**	**1.7956**

3.3 Site Preparation1 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1807	0.0000	0.1807	0.0993	0.0000	0.0993	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0124	0.2470	0.3237	5.0000e-004		0.0118	0.0118		0.0118	0.0118	0.0000	46.0632	46.0632	0.0143	0.0000	46.4217
Total	**0.0124**	**0.2470**	**0.3237**	**5.0000e-004**	**0.1807**	**0.0118**	**0.1925**	**0.0993**	**0.0118**	**0.1111**	**0.0000**	**46.0632**	**46.0632**	**0.0143**	**0.0000**	**46.4217**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.0000e-003	7.4000e-004	7.1100e-003	2.0000e-005	1.8900e-003	1.0000e-005	1.9000e-003	5.0000e-004	1.0000e-005	5.2000e-004	0.0000	1.7943	1.7943	5.0000e-005	0.0000	1.7956
Total	**1.0000e-003**	**7.4000e-004**	**7.1100e-003**	**2.0000e-005**	**1.8900e-003**	**1.0000e-005**	**1.9000e-003**	**5.0000e-004**	**1.0000e-005**	**5.2000e-004**	**0.0000**	**1.7943**	**1.7943**	**5.0000e-005**	**0.0000**	**1.7956**

3.4 Demolition2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	4.1600e-003	0.0429	0.0421	6.0000e-005		2.5200e-003	2.5200e-003		2.3200e-003	2.3200e-003	0.0000	5.6633	5.6633	1.7600e-003	0.0000	5.7074
Total	**4.1600e-003**	**0.0429**	**0.0421**	**6.0000e-005**		**2.5200e-003**	**2.5200e-003**		**2.3200e-003**	**2.3200e-003**	**0.0000**	**5.6633**	**5.6633**	**1.7600e-003**	**0.0000**	**5.7074**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.9200e-003	0.0897	0.0278	2.3000e-004	5.0400e-003	4.1000e-004	5.4500e-003	1.3900e-003	3.9000e-004	1.7800e-003	0.0000	22.6300	22.6300	1.2700e-003	0.0000	22.6617
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.8000e-004	1.7800e-003	0.0000	4.7000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4486	0.4486	1.0000e-005	0.0000	0.4489
Total	**3.1700e-003**	**0.0899**	**0.0296**	**2.3000e-004**	**5.5100e-003**	**4.1000e-004**	**5.9300e-003**	**1.5200e-003**	**3.9000e-004**	**1.9100e-003**	**0.0000**	**23.0786**	**23.0786**	**1.2800e-003**	**0.0000**	**23.1106**

3.4 Demolition2 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	1.5200e-003	0.0314	0.0470	6.0000e-005		1.8000e-003	1.8000e-003		1.8000e-003	1.8000e-003	0.0000	5.6633	5.6633	1.7600e-003	0.0000	5.7074
Total	**1.5200e-003**	**0.0314**	**0.0470**	**6.0000e-005**		**1.8000e-003**	**1.8000e-003**		**1.8000e-003**	**1.8000e-003**	**0.0000**	**5.6633**	**5.6633**	**1.7600e-003**	**0.0000**	**5.7074**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	2.9200e-003	0.0897	0.0278	2.3000e-004	5.0400e-003	4.1000e-004	5.4500e-003	1.3900e-003	3.9000e-004	1.7800e-003	0.0000	22.6300	22.6300	1.2700e-003	0.0000	22.6617
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5000e-004	1.8000e-004	1.7800e-003	0.0000	4.7000e-004	0.0000	4.8000e-004	1.3000e-004	0.0000	1.3000e-004	0.0000	0.4486	0.4486	1.0000e-005	0.0000	0.4489
Total	**3.1700e-003**	**0.0899**	**0.0296**	**2.3000e-004**	**5.5100e-003**	**4.1000e-004**	**5.9300e-003**	**1.5200e-003**	**3.9000e-004**	**1.9100e-003**	**0.0000**	**23.0786**	**23.0786**	**1.2800e-003**	**0.0000**	**23.1106**

3.5 Site Preparation2 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1656	0.0000	0.1656	0.0910	0.0000	0.0910	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0473	0.5029	0.2747	4.6000e-004		0.0260	0.0260		0.0240	0.0240	0.0000	42.2246	42.2246	0.0132	0.0000	42.5533
Total	**0.0473**	**0.5029**	**0.2747**	**4.6000e-004**	**0.1656**	**0.0260**	**0.1917**	**0.0910**	**0.0240**	**0.1150**	**0.0000**	**42.2246**	**42.2246**	**0.0132**	**0.0000**	**42.5533**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1000e-004	6.8000e-004	6.5100e-003	2.0000e-005	1.7300e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.6448	1.6448	5.0000e-005	0.0000	1.6460
Total	**9.1000e-004**	**6.8000e-004**	**6.5100e-003**	**2.0000e-005**	**1.7300e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.6448**	**1.6448**	**5.0000e-005**	**0.0000**	**1.6460**

3.5 Site Preparation2 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1656	0.0000	0.1656	0.0910	0.0000	0.0910	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0113	0.2264	0.2967	4.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	42.2246	42.2246	0.0132	0.0000	42.5532
Total	**0.0113**	**0.2264**	**0.2967**	**4.6000e-004**	**0.1656**	**0.0108**	**0.1764**	**0.0910**	**0.0108**	**0.1019**	**0.0000**	**42.2246**	**42.2246**	**0.0132**	**0.0000**	**42.5532**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1000e-004	6.8000e-004	6.5100e-003	2.0000e-005	1.7300e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.6448	1.6448	5.0000e-005	0.0000	1.6460
Total	**9.1000e-004**	**6.8000e-004**	**6.5100e-003**	**2.0000e-005**	**1.7300e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.6448**	**1.6448**	**5.0000e-005**	**0.0000**	**1.6460**

3.6 Site Preparation3 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1656	0.0000	0.1656	0.0910	0.0000	0.0910	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0473	0.5029	0.2747	4.6000e-004		0.0260	0.0260		0.0240	0.0240	0.0000	42.2246	42.2246	0.0132	0.0000	42.5533
Total	**0.0473**	**0.5029**	**0.2747**	**4.6000e-004**	**0.1656**	**0.0260**	**0.1917**	**0.0910**	**0.0240**	**0.1150**	**0.0000**	**42.2246**	**42.2246**	**0.0132**	**0.0000**	**42.5533**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1000e-004	6.8000e-004	6.5100e-003	2.0000e-005	1.7300e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.6448	1.6448	5.0000e-005	0.0000	1.6460
Total	**9.1000e-004**	**6.8000e-004**	**6.5100e-003**	**2.0000e-005**	**1.7300e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.6448**	**1.6448**	**5.0000e-005**	**0.0000**	**1.6460**

3.6 Site Preparation3 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1656	0.0000	0.1656	0.0910	0.0000	0.0910	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0113	0.2264	0.2967	4.6000e-004		0.0108	0.0108		0.0108	0.0108	0.0000	42.2246	42.2246	0.0132	0.0000	42.5532
Total	**0.0113**	**0.2264**	**0.2967**	**4.6000e-004**	**0.1656**	**0.0108**	**0.1764**	**0.0910**	**0.0108**	**0.1019**	**0.0000**	**42.2246**	**42.2246**	**0.0132**	**0.0000**	**42.5532**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	9.1000e-004	6.8000e-004	6.5100e-003	2.0000e-005	1.7300e-003	1.0000e-005	1.7500e-003	4.6000e-004	1.0000e-005	4.7000e-004	0.0000	1.6448	1.6448	5.0000e-005	0.0000	1.6460
Total	**9.1000e-004**	**6.8000e-004**	**6.5100e-003**	**2.0000e-005**	**1.7300e-003**	**1.0000e-005**	**1.7500e-003**	**4.6000e-004**	**1.0000e-005**	**4.7000e-004**	**0.0000**	**1.6448**	**1.6448**	**5.0000e-005**	**0.0000**	**1.6460**

3.7 Site Preparation4 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0172	0.1829	0.0999	1.7000e-004		9.4700e-003	9.4700e-003		8.7100e-003	8.7100e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**0.0172**	**0.1829**	**0.0999**	**1.7000e-004**	**0.0602**	**9.4700e-003**	**0.0697**	**0.0331**	**8.7100e-003**	**0.0418**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.7 Site Preparation4 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1200e-003	0.0823	0.1079	1.7000e-004		3.9300e-003	3.9300e-003		3.9300e-003	3.9300e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**4.1200e-003**	**0.0823**	**0.1079**	**1.7000e-004**	**0.0602**	**3.9300e-003**	**0.0642**	**0.0331**	**3.9300e-003**	**0.0370**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.8 Site Preparation5 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	0.0166	0.0000	0.0166	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.6100e-003	0.0914	0.0499	8.0000e-005		4.7400e-003	4.7400e-003		4.3600e-003	4.3600e-003	0.0000	7.6772	7.6772	2.3900e-003	0.0000	7.7370
Total	**8.6100e-003**	**0.0914**	**0.0499**	**8.0000e-005**	**0.0301**	**4.7400e-003**	**0.0349**	**0.0166**	**4.3600e-003**	**0.0209**	**0.0000**	**7.6772**	**7.6772**	**2.3900e-003**	**0.0000**	**7.7370**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2991	0.2991	1.0000e-005	0.0000	0.2993
Total	**1.7000e-004**	**1.2000e-004**	**1.1800e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2991**	**0.2991**	**1.0000e-005**	**0.0000**	**0.2993**

3.8 Site Preparation5 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	0.0166	0.0000	0.0166	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0600e-003	0.0412	0.0540	8.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	7.6772	7.6772	2.3900e-003	0.0000	7.7370
Total	**2.0600e-003**	**0.0412**	**0.0540**	**8.0000e-005**	**0.0301**	**1.9700e-003**	**0.0321**	**0.0166**	**1.9700e-003**	**0.0185**	**0.0000**	**7.6772**	**7.6772**	**2.3900e-003**	**0.0000**	**7.7370**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2991	0.2991	1.0000e-005	0.0000	0.2993
Total	**1.7000e-004**	**1.2000e-004**	**1.1800e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2991**	**0.2991**	**1.0000e-005**	**0.0000**	**0.2993**

3.9 Site Preparation6 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0172	0.1829	0.0999	1.7000e-004		9.4700e-003	9.4700e-003		8.7100e-003	8.7100e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**0.0172**	**0.1829**	**0.0999**	**1.7000e-004**	**0.0602**	**9.4700e-003**	**0.0697**	**0.0331**	**8.7100e-003**	**0.0418**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.9 Site Preparation6 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1200e-003	0.0823	0.1079	1.7000e-004		3.9300e-003	3.9300e-003		3.9300e-003	3.9300e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**4.1200e-003**	**0.0823**	**0.1079**	**1.7000e-004**	**0.0602**	**3.9300e-003**	**0.0642**	**0.0331**	**3.9300e-003**	**0.0370**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.10 Site Preparation7 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0172	0.1829	0.0999	1.7000e-004		9.4700e-003	9.4700e-003		8.7100e-003	8.7100e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**0.0172**	**0.1829**	**0.0999**	**1.7000e-004**	**0.0602**	**9.4700e-003**	**0.0697**	**0.0331**	**8.7100e-003**	**0.0418**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.10 Site Preparation7 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1200e-003	0.0823	0.1079	1.7000e-004		3.9300e-003	3.9300e-003		3.9300e-003	3.9300e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**4.1200e-003**	**0.0823**	**0.1079**	**1.7000e-004**	**0.0602**	**3.9300e-003**	**0.0642**	**0.0331**	**3.9300e-003**	**0.0370**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.11 Site Preparation8 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0172	0.1829	0.0999	1.7000e-004		9.4700e-003	9.4700e-003		8.7100e-003	8.7100e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**0.0172**	**0.1829**	**0.0999**	**1.7000e-004**	**0.0602**	**9.4700e-003**	**0.0697**	**0.0331**	**8.7100e-003**	**0.0418**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.11 Site Preparation8 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0602	0.0000	0.0602	0.0331	0.0000	0.0331	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.1200e-003	0.0823	0.1079	1.7000e-004		3.9300e-003	3.9300e-003		3.9300e-003	3.9300e-003	0.0000	15.3544	15.3544	4.7800e-003	0.0000	15.4739
Total	**4.1200e-003**	**0.0823**	**0.1079**	**1.7000e-004**	**0.0602**	**3.9300e-003**	**0.0642**	**0.0331**	**3.9300e-003**	**0.0370**	**0.0000**	**15.3544**	**15.3544**	**4.7800e-003**	**0.0000**	**15.4739**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	2.5000e-004	2.3700e-003	1.0000e-005	6.3000e-004	0.0000	6.3000e-004	1.7000e-004	0.0000	1.7000e-004	0.0000	0.5981	0.5981	2.0000e-005	0.0000	0.5985
Total	**3.3000e-004**	**2.5000e-004**	**2.3700e-003**	**1.0000e-005**	**6.3000e-004**	**0.0000**	**6.3000e-004**	**1.7000e-004**	**0.0000**	**1.7000e-004**	**0.0000**	**0.5981**	**0.5981**	**2.0000e-005**	**0.0000**	**0.5985**

3.12 Site Preparation9 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.6100e-003	0.0914	0.0499	8.0000e-005		4.7400e-003	4.7400e-003		4.3600e-003	4.3600e-003	0.0000	7.6772	7.6772	2.3900e-003	0.0000	7.7370
Total	**8.6100e-003**	**0.0914**	**0.0499**	**8.0000e-005**	**0.0903**	**4.7400e-003**	**0.0951**	**0.0497**	**4.3600e-003**	**0.0540**	**0.0000**	**7.6772**	**7.6772**	**2.3900e-003**	**0.0000**	**7.7370**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2991	0.2991	1.0000e-005	0.0000	0.2993
Total	**1.7000e-004**	**1.2000e-004**	**1.1800e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2991**	**0.2991**	**1.0000e-005**	**0.0000**	**0.2993**

3.12 Site Preparation9 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0600e-003	0.0412	0.0540	8.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	7.6772	7.6772	2.3900e-003	0.0000	7.7370
Total	**2.0600e-003**	**0.0412**	**0.0540**	**8.0000e-005**	**0.0903**	**1.9700e-003**	**0.0923**	**0.0497**	**1.9700e-003**	**0.0516**	**0.0000**	**7.6772**	**7.6772**	**2.3900e-003**	**0.0000**	**7.7370**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2991	0.2991	1.0000e-005	0.0000	0.2993
Total	**1.7000e-004**	**1.2000e-004**	**1.1800e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2991**	**0.2991**	**1.0000e-005**	**0.0000**	**0.2993**

3.13 Site Preparatino10 - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	0.0166	0.0000	0.0166	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	8.6100e-003	0.0914	0.0499	8.0000e-005		4.7400e-003	4.7400e-003		4.3600e-003	4.3600e-003	0.0000	7.6772	7.6772	2.3900e-003	0.0000	7.7370
Total	**8.6100e-003**	**0.0914**	**0.0499**	**8.0000e-005**	**0.0301**	**4.7400e-003**	**0.0349**	**0.0166**	**4.3600e-003**	**0.0209**	**0.0000**	**7.6772**	**7.6772**	**2.3900e-003**	**0.0000**	**7.7370**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2991	0.2991	1.0000e-005	0.0000	0.2993
Total	**1.7000e-004**	**1.2000e-004**	**1.1800e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2991**	**0.2991**	**1.0000e-005**	**0.0000**	**0.2993**

3.13 Site Preparatino10 - 2018

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0301	0.0000	0.0301	0.0166	0.0000	0.0166	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	2.0600e-003	0.0412	0.0540	8.0000e-005		1.9700e-003	1.9700e-003		1.9700e-003	1.9700e-003	0.0000	7.6772	7.6772	2.3900e-003	0.0000	7.7370
Total	**2.0600e-003**	**0.0412**	**0.0540**	**8.0000e-005**	**0.0301**	**1.9700e-003**	**0.0321**	**0.0166**	**1.9700e-003**	**0.0185**	**0.0000**	**7.6772**	**7.6772**	**2.3900e-003**	**0.0000**	**7.7370**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.7000e-004	1.2000e-004	1.1800e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2991	0.2991	1.0000e-005	0.0000	0.2993
Total	**1.7000e-004**	**1.2000e-004**	**1.1800e-003**	**0.0000**	**3.2000e-004**	**0.0000**	**3.2000e-004**	**8.0000e-005**	**0.0000**	**9.0000e-005**	**0.0000**	**0.2991**	**0.2991**	**1.0000e-005**	**0.0000**	**0.2993**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0141	0.0486	0.1607	4.7000e-004	0.0403	6.1000e-004	0.0409	0.0108	5.8000e-004	0.0114	0.0000	43.0709	43.0709	1.6200e-003	0.0000	43.1114
Unmitigated	0.0141	0.0486	0.1607	4.7000e-004	0.0403	6.1000e-004	0.0409	0.0108	5.8000e-004	0.0114	0.0000	43.0709	43.0709	1.6200e-003	0.0000	43.1114

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	11.91	143.33	105.46	108,626	108,626
Total	11.91	143.33	105.46	108,626	108,626

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	14.70	6.60	6.60	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
City Park	0.581869	0.044060	0.201715	0.114585	0.018910	0.005088	0.010143	0.010297	0.002003	0.003903	0.005948	0.000680	0.000800

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
City Park	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	2.5900e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1000e-004	1.1000e-004	0.0000	0.0000	1.2000e-004
Unmitigated	2.5900e-003	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1000e-004	1.1000e-004	0.0000	0.0000	1.2000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.5800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1000e-004	1.1000e-004	0.0000	0.0000	1.2000e-004
Total	**2.5900e-003**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.0000**	**1.2000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	2.5800e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.0000e-005	0.0000	6.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.1000e-004	1.1000e-004	0.0000	0.0000	1.2000e-004
Total	**2.5900e-003**	**0.0000**	**6.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.1000e-004**	**1.1000e-004**	**0.0000**	**0.0000**	**1.2000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	7.6429	3.5000e-004	7.0000e-005	7.6728
Unmitigated	7.6429	3.5000e-004	7.0000e-005	7.6728

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 7.50633	7.6429	3.5000e-004	7.0000e-005	7.6728
Total		**7.6429**	**3.5000e-004**	**7.0000e-005**	**7.6728**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
City Park	0 / 7.50633	7.6429	3.5000e-004	7.0000e-005	7.6728
Total		**7.6429**	**3.5000e-004**	**7.0000e-005**	**7.6728**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.1096	6.4800e-003	0.0000	0.2716
Unmitigated	0.1096	6.4800e-003	0.0000	0.2716

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.54	0.1096	6.4800e-003	0.0000	0.2716
Total		**0.1096**	**6.4800e-003**	**0.0000**	**0.2716**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
City Park	0.54	0.1096	6.4800e-003	0.0000	0.2716
Total		**0.1096**	**6.4800e-003**	**0.0000**	**0.2716**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

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Appendix D
California Natural Diversity Database (CNDDB) Table

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Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (San Geronimo (3812216) OR Petaluma (3812226) OR Petaluma River (3812225) OR Novato (3812215) OR Point Reyes NE (3812227) OR Inverness (3812217) OR San Rafael (3712285) OR Bolinas (3712286) OR Double Point (3712287))

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Abronia umbellata var. breviflora pink sand-verbena	G4G5T2 S1	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	5 50	57 S:2	0	0	0	1	0	1	0	2	2	0	0
Adela oplerella Opler's longhorn moth	G2 S2	None None		400 1,300	14 S:3	0	0	0	0	0	3	3	0	3	0	0
Agrostis blasdalei Blasdale's bent grass	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	200 1,200	58 S:2	0	0	0	0	0	2	0	2	2	0	0
Allium peninsulare var. franciscanum Franciscan onion	G5T1 S1	None None	Rare Plant Rank - 1B.2	30 30	21 S:1	0	0	0	0	0	1	1	0	1	0	0
Alopecurus aequalis var. sonomensis Sonoma alopecurus	G5T1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	40 300	21 S:2	0	0	0	1	0	1	2	0	2	0	0
Ambystoma californiense California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	85 85	1150 S:2	0	1	0	0	1	0	1	1	1	1	0
Amorpha californica var. napensis Napa false indigo	G4T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	400 2,000	69 S:18	2	0	0	0	1	15	6	12	17	1	0
Amsinckia lunaris bent-flowered fiddleneck	G2G3 S2S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	400 400	64 S:3	0	0	0	0	0	3	3	0	3	0	0
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	40 730	408 S:14	1	2	0	1	3	7	8	6	11	3	0
Aplodontia rufa phaea Point Reyes mountain beaver	G5T2 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	200 400	9 S:5	0	0	0	0	3	2	5	0	2	3	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Arctostaphylos montana ssp. montana Mt. Tamalpais manzanita	G3T3 S3	None None	Rare Plant Rank - 1B.3	500 2,220	15 S:15	0	1	0	0	0	14	10	5	15	0	0
Arctostaphylos virgata Marin manzanita	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	5 2,625	32 S:29	1	3	3	2	0	20	13	16	29	0	0
Ardea alba great egret	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	18 100	38 S:3	0	1	0	0	0	2	2	1	3	0	0
Ardea herodias great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	18 250	138 S:7	0	1	0	0	1	5	6	1	6	1	0
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	G2T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_SBBG-Santa Barbara Botanic Garden		25 S:2	0	0	0	0	1	1	2	0	1	1	0
Astragalus tener var. tener alkali milk-vetch	G2T2 S2	None None	Rare Plant Rank - 1B.2	30 30	65 S:1	0	0	0	0	1	0	1	0	0	0	1
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	-1 1,720	1936 S:7	1	2	3	0	0	1	1	6	7	0	0
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	50 2,500	181 S:14	0	0	0	0	0	14	13	1	14	0	0
Bombus occidentalis western bumble bee	G2G3 S1	None None	USFS_S-Sensitive XERCES_IM-Imperiled	0 2,000	282 S:14	0	0	0	0	0	14	14	0	14	0	0
Buteo swainsoni Swainson's hawk	G5 S3	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	120 120	2426 S:1	0	0	0	0	1	0	1	0	0	1	0
Caecidotea tomalensis Tomales isopod	G2 S2S3	None None		100 100	6 S:1	0	1	0	0	0	0	1	0	1	0	0

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Calamagrostis crassiglumis Thurber's reed grass	G3Q S2	None None	Rare Plant Rank - 2B.1		15 S:1	0	0	0	0	0	1	1	0	1	0	0
Calicina diminua Marin blind harvestman	G1 S1	None None		150 150	1 S:1	0	0	0	0	0	1	1	0	1	0	0
California macrophylla round-leaved filaree	G3? S3?	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden SB_SBBG-Santa Barbara Botanic Garden		162 S:1	0	0	0	0	0	1	1	0	1	0	0
Callophrys mossii bayensis San Bruno elfin butterfly	G4T1 S1	Endangered None	XERCES_CI-Critically Imperiled	780 780	10 S:1	0	0	0	0	0	1	1	0	1	0	0
Callophrys mossii marinensis Marin elfin butterfly	G4T1 S1	None None		200 200	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Campanula californica swamp harebell	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	5 800	132 S:7	0	2	0	0	0	5	6	1	7	0	0
Cardamine angulata seaside bittercress	G5 S1	None None	Rare Plant Rank - 2B.1		5 S:1	0	0	0	0	0	1	1	0	1	0	0
Carex lyngbyei Lyngbye's sedge	G5 S3	None None	Rare Plant Rank - 2B.2	10 100	29 S:4	1	1	0	0	0	2	2	2	4	0	0
Castilleja affinis var. neglecta Tiburon paintbrush	G4G5T1T2 S1S2	Endangered Threatened	Rare Plant Rank - 1B.2 SB_UCBBG-UC Berkeley Botanical Garden	900 900	7 S:1	0	1	0	0	0	0	0	1	1	0	0
Castilleja ambigua var. humboldtiensis Humboldt Bay owl's-clover	G4T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	5 6	31 S:3	1	2	0	0	0	0	0	3	3	0	0
Ceanothus decornutus Nicasio ceanothus	G1 S1	None None	Rare Plant Rank - 1B.2	800 950	2 S:2	0	0	0	0	0	2	0	2	2	0	0
Ceanothus gloriosus var. porrectus Mt. Vision ceanothus	G4T2 S2	None None	Rare Plant Rank - 1B.3	60 1,000	18 S:3	0	2	0	0	0	1	0	3	3	0	0

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Ceanothus masonii Mason's ceanothus	G1 S1	None Rare	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	600 1,500	8 S:8	1	2	1	0	0	4	4	4	8	0	0
Charadrius alexandrinus nivosus western snowy plover	G3T3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	0 20	125 S:3	0	1	0	0	0	2	2	1	3	0	0
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	G4?T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	0 10	68 S:22	4	5	3	1	1	8	9	13	21	1	0
Chloropyron molle ssp. molle soft salty bird's-beak	G2T1 S1	Endangered Rare	Rare Plant Rank - 1B.2	5 5	27 S:2	0	0	0	0	2	0	2	0	0	2	0
Chorizanthe cuspidata var. cuspidata San Francisco Bay spineflower	G2T1 S1	None None	Rare Plant Rank - 1B.2	1,800 1,800	17 S:1	0	0	0	0	0	1	1	0	1	0	0
Chorizanthe valida Sonoma spineflower	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	30 30	6 S:1	0	0	0	0	1	0	1	0	0	1	0
Cicindela hirticollis gravida sandy beach tiger beetle	G5T2 S2	None None		10 10	34 S:1	0	0	0	0	1	0	1	0	0	0	1
Cicuta maculata var. bolanderi Bolander's water-hemlock	G5T4 S2	None None	Rare Plant Rank - 2B.1	40 40	17 S:2	0	0	0	0	0	2	1	1	2	0	0
Cirsium andrewsii Franciscan thistle	G3 S3	None None	Rare Plant Rank - 1B.2	5 300	31 S:3	0	0	0	0	0	3	2	1	3	0	0
Cirsium hydrophilum var. vaseyi Mt. Tamalpais thistle	G2T1 S1	None None	Rare Plant Rank - 1B.2	600 2,000	14 S:13	2	6	0	0	0	5	7	6	13	0	0
Coastal Brackish Marsh Coastal Brackish Marsh	G2 S2.1	None None		15 15	30 S:2	0	0	1	0	0	1	2	0	2	0	0
Coastal Terrace Prairie Coastal Terrace Prairie	G2 S2.1	None None		400 400	8 S:1	0	0	0	0	0	1	1	0	1	0	0

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Collinsia corymbosa round-headed Chinese-houses	G1 S1	None None	Rare Plant Rank - 1B.2		13 S:1	0	0	0	0	0	1	1	0	1	0	0
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	10 470	625 S:11	1	2	0	0	1	7	6	5	10	1	0
Cypseloides niger black swift	G4 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_YWL-Yellow Watch List USFWS_BCC-Birds of Conservation Concern	600 600	46 S:1	0	0	0	0	0	1	1	0	1	0	0
Danaus plexippus pop. 1 monarch - California overwintering population	G4T2T3 S2S3	None None	USFS_S-Sensitive	20 250	378 S:12	0	7	3	0	2	0	5	7	10	1	1
Delphinium bakeri Baker's larkspur	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	350 400	6 S:4	0	0	0	1	0	3	0	4	4	0	0
Delphinium luteum golden larkspur	G1 S1	Endangered Rare	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	150 150	11 S:1	0	0	0	0	0	1	1	0	1	0	0
Dicamptodon ensatus California giant salamander	G3 S2S3	None None	CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	50 1,300	229 S:26	5	4	0	1	0	16	14	12	26	0	0
Dirca occidentalis western leatherwood	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	140 600	65 S:5	0	1	0	0	0	4	3	2	5	0	0
Egretta thula snowy egret	G5 S4	None None	IUCN_LC-Least Concern	18 18	17 S:1	0	1	0	0	0	0	0	1	1	0	0

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Elanus leucurus white-tailed kite	G5 S3S4	None None	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern	75 75	164 S:1	0	0	0	0	0	1	1	0	1	0	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	12 784	1236 S:20	1	10	5	0	0	4	1	19	20	0	0
Entosthodon kochii Koch's cord moss	G1 S1	None None	Rare Plant Rank - 1B.3		4 S:1	0	0	0	0	0	1	1	0	1	0	0
Eriogonum luteolum var. caninum Tiburon buckwheat	G5T2 S2	None None	Rare Plant Rank - 1B.2	312 2,100	26 S:18	2	0	0	0	0	16	10	8	18	0	0
Erysimum concinnum bluff wallflower	G3 S2	None None	Rare Plant Rank - 1B.2		30 S:1	0	0	0	0	0	1	1	0	1	0	0
Eucyclogobius newberryi tidewater goby	G3 S3	Endangered None	AFS_EN-Endangered CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	10 35	117 S:3	0	0	0	0	3	0	3	0	0	0	3
Fissidens pauperculus minute pocket moss	G3? S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	1,000 1,000	22 S:2	0	0	0	0	0	2	2	0	2	0	0
Fritillaria lanceolata var. tristulis Marin checker lily	G5T2 S2	None None	Rare Plant Rank - 1B.1	40 1,000	32 S:13	0	0	5	0	0	8	7	6	13	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	40 900	81 S:13	0	5	4	0	0	4	3	10	13	0	0
Geothlypis trichas sinuosa saltmarsh common yellowthroat	G5T3 S3	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	0 170	112 S:11	2	2	0	0	0	7	7	4	11	0	0
Gilia capitata ssp. chamissonis blue coast gilia	G5T2 S2	None None	Rare Plant Rank - 1B.1	20 40	37 S:2	0	0	1	0	0	1	1	1	2	0	0
Gilia capitata ssp. tomentosa woolly-headed gilia	G5T1 S1	None None	Rare Plant Rank - 1B.1	300 400	11 S:2	0	0	0	0	0	2	2	0	2	0	0
Gilia millefoliata dark-eyed gilia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		54 S:1	0	0	0	0	0	1	1	0	1	0	0

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Helianthella castanea Diablo helianthella	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive		107 S:1	0	0	0	0	0	1	1	0	1	0	0
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	G5T1T2 S1S2	None None	Rare Plant Rank - 1B.2	60 492	33 S:8	0	1	2	0	0	5	6	2	8	0	0
Hesperolinon congestum Marin western flax	G1 S1	Threatened Threatened	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	200 1,200	26 S:9	1	4	1	0	0	3	1	8	9	0	0
Heteranthera dubia water star-grass	G5 S2	None None	Rare Plant Rank - 2B.2	80 80	9 S:1	0	0	0	0	0	1	1	0	1	0	0
Holocarpha macradenia Santa Cruz tarplant	G1 S1	Threatened Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	120 120	37 S:2	0	0	0	0	1	1	2	0	1	1	0
Horkelia marinensis Point Reyes horkelia	G2 S2	None None	Rare Plant Rank - 1B.2		36 S:1	0	0	0	0	0	1	1	0	1	0	0
Horkelia tenuiloba thin-lobed horkelia	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	1,100 2,100	27 S:5	1	2	0	0	0	2	3	2	5	0	0
Hydrochara ricksecker Ricksecker's water scavenger beetle	G2? S2?	None None		160 160	13 S:1	0	0	0	0	0	1	1	0	1	0	0
Ischnura gemina San Francisco forktail damselfly	G2 S2	None None	IUCN_VU-Vulnerable	25 25	7 S:1	0	0	0	0	0	1	1	0	1	0	0
Kopsiopsis hookeri small groundcone	G4? S1S2	None None	Rare Plant Rank - 2B.3	400 1,785	21 S:4	0	0	1	0	0	3	3	1	4	0	0
Lasionycteris noctivagans silver-haired bat	G5 S3S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority	580 580	138 S:2	0	0	0	0	0	2	2	0	2	0	0
Lasiurus blossevillii western red bat	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern WBWG_H-High Priority	43 43	122 S:1	0	1	0	0	0	0	0	1	1	0	0

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Lasiurus cinereus hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority	40 1,215	235 S:7	0	0	0	0	0	7	7	0	7	0	0
Lasthenia californica ssp. macrantha perennial goldfields	G3T2 S2	None None	Rare Plant Rank - 1B.2	80 80	59 S:1	0	0	0	0	0	1	1	0	1	0	0
Lasthenia conjugens Contra Costa goldfields	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	280 280	33 S:1	0	1	0	0	0	0	0	1	1	0	0
Laterallus jamaicensis coturniculus California black rail	G3G4T1 S1	None Threatened	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	0 30	241 S:20	4	5	0	2	0	9	8	12	20	0	0
Lavinia symmetricus ssp. 2 Tomales roach	G4T2T3 S2	None None	CDFW_SSC-Species of Special Concern	10 190	4 S:4	2	1	1	0	0	0	0	4	4	0	0
Lessingia micradenia var. micradenia Tamalpais lessingia	G2T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	200 1,000	9 S:9	0	1	0	0	0	8	4	5	9	0	0
Lichnanthe ursina bumblebee scarab beetle	G2 S2	None None			8 S:1	0	0	0	0	0	1	1	0	1	0	0
Lilaeopsis masonii Mason's lilaeopsis	G2 S2	None Rare	Rare Plant Rank - 1B.1	5 5	197 S:1	0	0	0	0	1	0	1	0	0	0	1
Lilium maritimum coast lily	G2 S2	None None	Rare Plant Rank - 1B.1	20 20	76 S:1	0	0	0	0	0	1	1	0	1	0	0

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Lilium pardalinum ssp. pitkinense Pitkin Marsh lily	G5T1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_BerrySB-Berry Seed Bank SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture		4 S:1	0	0	0	0	1	0	1	0	0	1	0
Melospiza melodia samuelis San Pablo song sparrow	G5T2 S2	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	0 20	41 S:15	2	4	0	0	0	9	9	6	15	0	0
Microseris paludosa marsh microseris	G2 S2	None None	Rare Plant Rank - 1B.2	500 500	39 S:4	0	0	0	0	0	4	4	0	4	0	0
Mielichhoferia elongata elongate copper moss	G5 S4	None None	Rare Plant Rank - 4.3 USFS_S-Sensitive	100 100	20 S:1	0	0	0	0	0	1	0	1	1	0	0
Navarretia leucocephala ssp. bakeri Baker's navarretia	G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	200 200	58 S:1	0	1	0	0	0	0	0	1	1	0	0
Navarretia rosulata Marin County navarretia	G2 S2	None None	Rare Plant Rank - 1B.2	900 1,980	13 S:10	0	2	0	0	0	8	10	0	10	0	0
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	G3 S3.2	None None		10 15	53 S:7	0	1	1	0	0	5	7	0	7	0	0
Northern Maritime Chaparral Northern Maritime Chaparral	G1 S1.2	None None		300 300	17 S:1	0	1	0	0	0	0	1	0	1	0	0
Northern Vernal Pool Northern Vernal Pool	G2 S2.1	None None		240 240	20 S:1	0	0	0	0	0	1	1	0	1	0	0
Oncorhynchus kisutch coho salmon - central California coast ESU	G4 S2?	Endangered Endangered	AFS_EN-Endangered	130 180	22 S:2	0	1	0	0	0	1	0	2	2	0	0
Oncorhynchus mykiss irideus steelhead - central California coast DPS	G5T2T3Q S2S3	Threatened None	AFS_TH-Threatened	40 400	39 S:3	1	0	1	1	0	0	0	3	3	0	0
Pandion haliaetus osprey	G5 S4	None None	CDF_S-Sensitive CDFW_WL-Watch List IUCN_LC-Least Concern	400 400	496 S:1	0	0	0	0	0	1	1	0	1	0	0

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Pentachaeta bellidiflora white-rayed pentachaeta	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBBG-UC Berkeley Botanical Garden	120 400	14 S:6	0	0	0	0	5	1	6	0	1	0	5
Phacelia insularis var. continentis North Coast phacelia	G2T2 S2	None None	Rare Plant Rank - 1B.2		15 S:1	0	0	0	0	0	1	1	0	1	0	0
Plagiobothrys glaber hairless popcornflower	GH SH	None None	Rare Plant Rank - 1A		9 S:1	0	0	0	0	1	0	1	0	0	1	0
Plagiobothrys mollis var. vestitus Petaluma popcornflower	G4?TX SX	None None	Rare Plant Rank - 1A	20 20	1 S:1	0	0	0	0	1	0	1	0	0	1	0
Pleuropogon hooverianus North Coast semaphore grass	G2 S2	None Threatened	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_BerrySB-Berry Seed Bank SB_RSABG-Rancho Santa Ana Botanic Garden	350 500	26 S:5	1	0	0	1	2	1	3	2	3	2	0
Pogonichthys macrolepidotus Sacramento splittail	GNR S3	None None	AFS_VU-Vulnerable CDFW_SSC-Species of Special Concern IUCN_EN-Endangered	1 1	15 S:1	0	0	0	0	0	1	0	1	1	0	0
Polygonum marinense Marin knotweed	G2Q S2	None None	Rare Plant Rank - 3.1	5 5	32 S:5	0	0	2	0	0	3	4	1	5	0	0
Pomatiopsis binneyi robust walker	G1 S1	None None		150 2,040	2 S:2	0	0	0	0	0	2	2	0	2	0	0
Quercus parvula var. tamalpaisensis Tamalpais oak	G4T2 S2	None None	Rare Plant Rank - 1B.3	500 2,000	9 S:9	0	1	0	1	0	7	8	1	9	0	0
Rallus longirostris obsoletus California clapper rail	G5T1 S1	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List	2 18	98 S:15	2	5	0	0	1	7	5	10	14	1	0
Rana boylii foothill yellow-legged frog	G3 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	30 1,600	888 S:10	1	1	2	0	0	6	4	6	10	0	0

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Rana draytonii California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	10 1,060	1408 S:60	4	10	3	0	0	43	6	54	60	0	0
Reithrodontomys raviventris salt-marsh harvest mouse	G1G2 S1S2	Endangered Endangered	CDFW_FP-Fully Protected IUCN_EN-Endangered	1 8	144 S:7	0	0	0	2	1	4	6	1	6	1	0
Riparia riparia bank swallow	G5 S2	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern	25 25	297 S:1	0	0	0	0	0	1	1	0	1	0	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		1,000 1,000	22 S:1	0	0	0	0	0	1	1	0	1	0	0
Setophaga petechia yellow warbler	G5 S3S4	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	20 20	69 S:1	0	0	0	0	0	1	1	0	1	0	0
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	G5T2 S2	None None	Rare Plant Rank - 1B.2	30 300	34 S:3	0	0	0	0	0	3	3	0	3	0	0
Sidalcea hickmanii ssp. viridis Marin checkerbloom	G3TH SH	None None	Rare Plant Rank - 1B.1	500 1,390	4 S:2	0	0	0	0	0	2	2	0	2	0	0
Spirinchus thaleichthys longfin smelt	G5 S1	Candidate Threatened	CDFW_SSC-Species of Special Concern	0 0	45 S:3	0	0	0	0	0	3	1	2	3	0	0
Stebbinsoseris decipiens Santa Cruz microseris	G2 S2	None None	Rare Plant Rank - 1B.2	460 2,450	19 S:3	0	0	0	0	1	2	1	2	2	1	0
Streptanthus batrachopus Tamalpais jewelflower	G2 S2	None None	Rare Plant Rank - 1B.3	1,100 2,200	8 S:8	1	2	2	0	0	3	4	4	8	0	0
Streptanthus glandulosus ssp. pulchellus Mt. Tamalpais bristly jewelflower	G4T2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	420 2,200	24 S:24	4	5	0	0	0	15	13	11	24	0	0
Syncaris pacifica California freshwater shrimp	G2 S2	Endangered Endangered	IUCN_EN-Endangered	30 120	18 S:2	0	0	2	0	0	0	0	2	2	0	0
Talanites ubicki Ubick's gnaphosid spider	G1 S1	None None		150 150	1 S:1	0	0	0	0	0	1	1	0	1	0	0

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Taricha rivularis red-bellied newt	G4 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	20 20	136 S:1	0	0	0	0	0	1	1	0	1	0	0
Taxidea taxus American badger	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	40 200	535 S:5	0	0	1	0	0	4	4	1	5	0	0
Trachusa gummifera San Francisco Bay Area leaf-cutter bee	G1 S1	None None		1,130 1,130	2 S:1	0	0	0	0	0	1	1	0	1	0	0
Trifolium amoenum two-fork clover	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	300 300	26 S:4	0	0	0	0	2	2	4	0	2	2	0
Triphysaria floribunda San Francisco owl's-clover	G2? S2?	None None	Rare Plant Rank - 1B.2		50 S:1	0	0	0	0	0	1	1	0	1	0	0
Triquetrella californica coastal triquetrella	G2 S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive		13 S:1	0	0	0	0	0	1	1	0	1	0	0
Tryonia imitator mimic tryonia (=California brackishwater snail)	G2 S2	None None	IUCN_DD-Data Deficient	0 6	39 S:2	0	0	0	0	1	1	2	0	1	0	1
Vespericola marinensis Marin hesperian	G2 S2	None None		25 600	23 S:14	0	0	0	0	0	14	14	0	14	0	0

Appendix E
California Red-legged Frog Relocation Plan

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California Red-legged Frog Relocation Plan

Following avoidance measures and implementing approaches to minimize impact to California Red-legged Frogs that may be found at the project site, relocating individual frogs found within the project area would be necessary.

The name(s) and credentials of the qualified biologist(s) to act as construction monitors shall be submitted to the USFWS for approval at least 15 days before construction work begins. These construction monitors will be at the site during work periods to observe the site and survey for California red-legged frogs.

If California red-legged frogs are found at the project site during work activities, project personnel, including the qualified biologist(s) approved by USFWS shall notify USFWS and NPS of the species found.

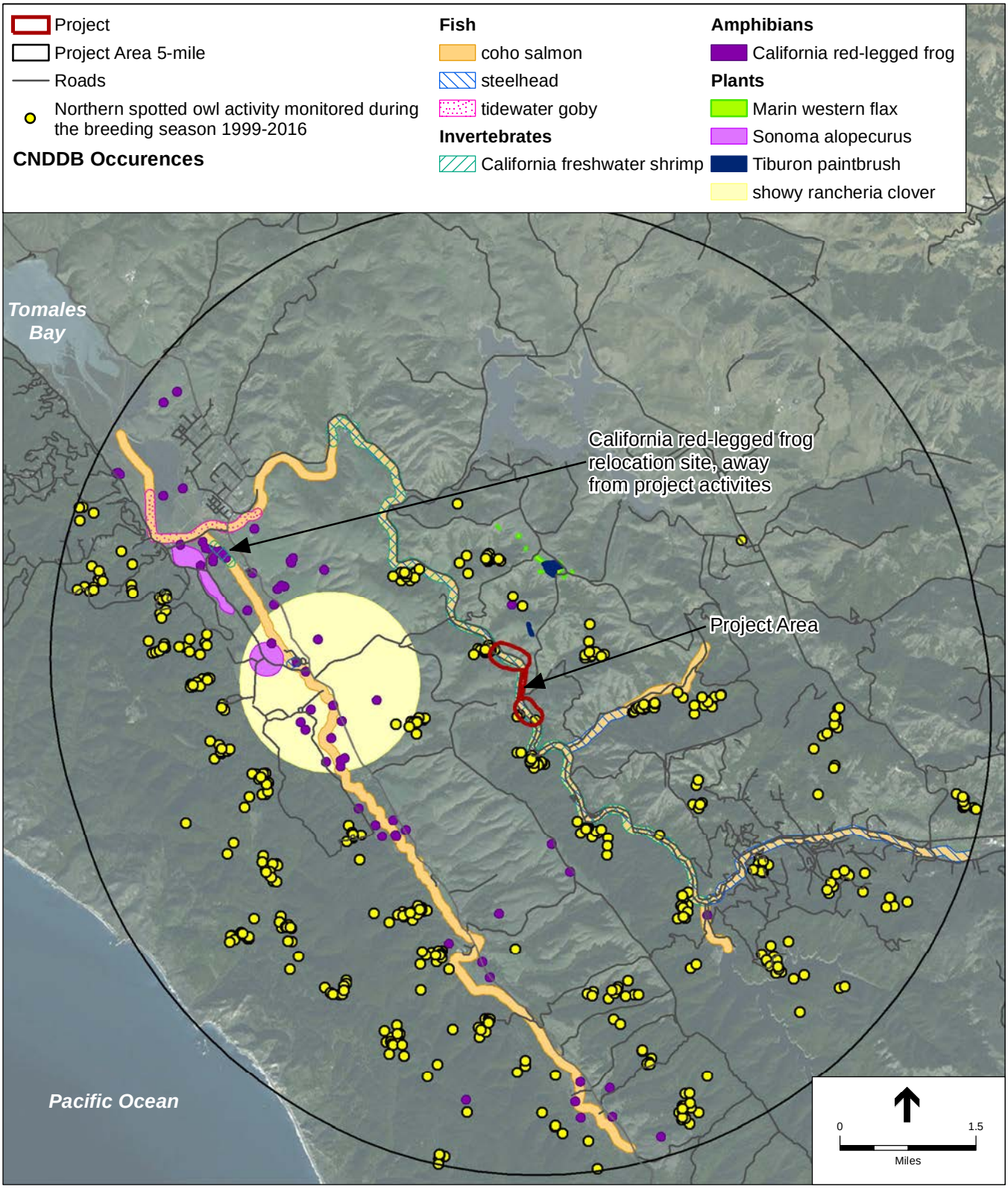
The location proposed for relocation of California red-legged frogs that are found within the project area is approximately 0.25 miles west within the floodplain forests and streamside banks of Lagunitas Creek, downstream of the project site on National Park Service land. This location, according to the CNDDB, maintains California red-legged frog habitat with large floodplain forests and low wet territories adjacent to Lagunitas Creek. A map of this location is provided as an attachment to this plan.

If individual frogs are found in the project area and need to be relocated, qualified biologists will handle frogs carefully with latex or nitrile cloves, and placed in clean cooler with a damp towel on the bottom. No more than 3 individual frogs will be placed in one cooler.

The frogs will be driven immediately after capture to the release site on Lagunitas Creek, approximately 1 minute away by car. The frogs will be released adjacent to a creek or wetland environment at least 25 yards away from a road or trail where they can quickly access water. The frogs will be released by turning the bucket down slowly against the ground to allow them

to crawl out on their own and away from the bucket. Frogs will be monitored for no less than 5 minutes, or until they move out of site, to confirm that each frog relocated recovered from the transport. If any frogs are observed to have been hurt, killed, or injured in the process of relocation, the qualified biologist will immediately report the incident of harm, injury, or mortality of a California red-legged frog to USFWS and NPS. Photos of the frogs will be collected during the relocation efforts to help document the process.

All data collected on California red-legged frogs gathered from the relocation process will be reported to the USFWS and NPS by qualified biologist(s) no later than 10 days following the relocation of California red-legged frogs.



SOURCE: aerial (ESRI), creeks (NHD), action area (ESA 2017), CNDDB (CDFW 2017)

Lagunitas Creek Floodplain and Riparian Enhancement Project . 150145

Figure 1

CNDDB Occurrences of Federally-Listed Species within 5 miles of the Action Area