# CHAPTER 3
# Environmental Setting, Impacts, and Mitigation Measures

## 3.1 Introduction to the Analysis

### 3.1.1 Scope of the EIR

This chapter of the environmental impact report (EIR) presents the environmental and regulatory setting, impacts, and mitigation measures for the technical issue areas applicable to the Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project (Proposed Project, or Project). The environmental analysis provided is organized according to the California Environmental Quality Act (CEQA) resource areas as outlined in Appendix G of the CEQA Guidelines. Sections 3.2 through 3.6 present the following resource areas addressed in this EIR:

- 3.2 Aesthetics
- 3.3 Air Quality
- 3.4 Biological Resources
- 3.5 Greenhouse Gas Emissions
- 3.6 Hydrology and Water Quality

All other resource areas from CEQA Guidelines Appendix G were analyzed in an initial study, included as **Appendix B** to this EIR. During this evaluation, it was determined that the Project would result in no impact or a less-than-significant impact related to the resource areas listed below, requiring no (or minimal) mitigation measures; therefore, these resource areas are not discussed in detail in the EIR:

- Agriculture and Forestry Resources
- Cultural Resources
- Energy
- Geology and Soils
- Hazards and Hazardous Materials
- Land Use and Planning

- Mineral Resources
- Noise
- Population and Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities and Service Systems
- Wildfire

## 3.1.2 Section Format

Each section contains, as relevant:

- Identification of the technical issue areas being evaluated in the section.
- The environmental and regulatory setting.[1]
- Standards of significance.
- The method of analysis.
- An assessment of Project impacts.
- Recommended mitigation measures that would reduce or avoid significant impacts, as applicable.

The environmental and regulatory setting discussion presented in each of resource area section summarizes the conditions existing before implementation of the Project, and provides a point of reference (or baseline) for assessing the environmental impacts of the proposed Project. Each discussion of impacts and mitigation measures includes an impact statement (presented in **bold text**), an explanation of the impact (as it relates to the Project), an analysis of the impact's significance, identification of relevant mitigation measures if applicable, and an evaluation of whether the identified mitigation measures would reduce the magnitude of identified impacts. Each impact statement is assigned a number based on the section and the order they appear (for example, 3.2-1, 3.2-2, etc., for impacts in Section 3.2). Mitigation measures for each impact are numbered in order (for example, 3.2-1, 3.2-2, etc., for mitigation measures in Section 3.2).

## 3.1.3 Significance Determinations

The significance criteria used in this EIR are based on CEQA Guidelines Appendix G, with some modifications. The significance criteria used to analyze each environmental resource topic are

[1] Per CEQA Guidelines Section 15125, an EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published, or if no notice of preparation is published, at the time environmental analysis is commenced, from both a local and regional perspective.

presented in each section of Chapter 3 before the discussion of impacts. The categories used to designate impact significance are described below.

- **No Impact.** A project is considered to have no impact if there is no potential for impacts, or if the environmental resource does not exist within the project area or the area of potential effect. For example, there would be no impact related to wastewater disposal if the Project would not involve the production of wastewater.
- **Less than Significant.** This determination applies if there is a potential for some limited impact, but not a substantial adverse effect that qualifies under the significance criterion as a significant impact. No mitigation is required for impacts determined to be less than significant.
- **Less than Significant with Mitigation.** This determination applies to impacts that either could be or would be significant and likely to occur, but for which feasible mitigation is available to reduce the impacts to a less-than-significant level. Some of the impact significance determinations in this EIR are conservative, in that although there is no known information to suggest a definite significant impact, those impacts are treated as significant and mitigation measures are proposed to reduce those impacts to less than significant.
- **Significant and Unavoidable.** This determination applies to impacts that either could be or would be significant, but for which no feasible mitigation has been identified to reduce the impacts to a less-than-significant level. Some mitigation might be available to lessen the impact, but the residual effect remains significant, and therefore the impact is considered unavoidable.

In determining the significance of a Project impact, the analysis first describes the nature, frequency, magnitude, and/or severity of a potential effect and then determines that it either would be significant or less than significant, or that no impact would occur, based on the appropriate significance criteria.

### 3.1.4 Approach to the Cumulative Projects Scenario and Cumulative Impact Analysis

#### CEQA Analysis Requirements

As defined in CEQA Guidelines Section 15355, a cumulative impact is an environmental impact that is created by the combination of the proposed project being evaluated and other projects causing related impacts. CEQA Guidelines Section 15130 requires that an EIR discuss a project's contribution to cumulative impacts. The cumulative impact analysis may be less detailed than the analysis of a given project's individual effects (CEQA Guidelines Section 15130(b)). The cumulative impact from several projects is defined as "….the change in the environment which results from the incremental impact of the project added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individual minor but collectively significant projects taking place over a period of time" (CEQA Guidelines Section 15355(b)).

Section 15130(b) of the CEQA Guidelines requires one of the following approaches for an adequate discussion of significant cumulative impacts of a project:

- A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency.
- A summary of projections contained in an adopted general plan or related planning document or in an adopted or certified environmental document that described or evaluated regional or area-wide conditions contributing to the cumulative impact.

The cumulative impact analysis in this EIR specifically uses the first ("list") approach.

## Related Projects

### *Geographic Context*

The geographic area that could be affected by implementation of the Proposed Project in combination with other projects varies depending on the type of environmental resource being considered. The impact analysis in this EIR considers different geographic areas as appropriate to each impact. Many cumulative impacts (such as impacts on biological resources) would occur within the immediate vicinity of a project (adjacent to or within one-half mile); some impacts (such as impacts on hydrology and water quality) affect the local watershed; and some impacts are regional (such as air quality impacts related to criteria pollutant emissions).

The Proposed Project would restore former tidal marshlands and improve the shoreline levee at the confluence of San Rafael Creek and San Rafael Bay. (The Project site lies along the northern boundary of the Canal neighborhood in central San Rafael. Tiscornia Marsh is bounded on the west by the Albert J. Boro Community Center and Pickleweed Park. To the north is the mouth of San Rafael Creek, and to the east is San Rafael Bay. The location of the former Schoen Park (converted by the City of San Rafael in 2019) lies south of the Tiscornia Marsh shoreline levee, on the southeastern portion of the Project site, bordered by Spinnaker Point Drive (see Figure 2-2).

### *List of Cumulative Plans and Projects*

**Table 3.1-1** lists past, present, and reasonably foreseeable probable future projects within and near the Project site whose impacts could add to the impacts of the Proposed Project. For each project, this table presents the planning jurisdiction, a brief description, the distance of that project to the Project site, and the project's estimated construction schedule. The cumulative project information listed in Table 3.1-1 is based on information supplied by the City of San Rafael, as well as information from other entities, review of EIRs, and review of information posted on agency websites. The list includes planned, approved, reasonably foreseeable, and recently constructed projects of various purposes, such as infrastructure repair/enhancement, flood control, water supply, and recreation improvements.

**TABLE 3.1-1**
**PROJECTS IN THE VICINITY OF THE PROPOSED PROJECT EVALUATED FOR CUMULATIVE IMPACTS**

| Project Name | Location | Project Description | Distance from the Proposed Project | Potential Cumulative Impact Topics | Lead Agency | Schedule/Status |
|---|---|---|---|---|---|---|
| **Pickleweed Field and Park Project** | 50 Canal Street, San Rafael | Planning, design, and construction of improvements to Pickleweed Park and Field. The work will convert the field at Pickleweed to synthetic turf for year-round access and install several other recreation features. | Adjacent to Tiscornia Marsh | Air Quality, Biological Resources, Transportation | City of San Rafael Department of Public Works | Design and planning phase, 2020–2021<br>Construction projected to be complete in 2025 |
| **Schoen Park Conversion to Parking** | On Canal Street near the junction with Spinnaker Point Drive, San Rafael | Planning, design, and construction of revisions to Schoen Park. The modifications will create approximately 20 new parking spaces in the previous footprint of Schoen Park. | Adjacent to Tiscornia Marsh | Air Quality, Biological Resources, Transportation | City of San Rafael Department of Public Works | Design and planning phase, 2019–2021<br>Construction projected to begin in 2021 |
| **Canal Neighborhood Pedestrian Safety Improvements** | Various locations | Proposed improvements and safety enhancements that include installations of:<br>• Americans with Disabilities Act curb ramps<br>• Rapid rectangular flashing beacons<br>• Quick-build bulb-outs<br>• Street lighting | Within approximately 5 miles of Tiscornia Marsh | Air Quality, Transportation | City of San Rafael Department of Public Works | Construction to begin 2021 |
| **The Village at Loch Lomond Marina Project** | 110 Loch Lomond Drive, San Rafael | Construction of improvements to the playground area on the eastern jetty and the entrance to the breakwater. | Approximately 4 miles northeast of Tiscornia Marsh | Biological Resources, Hydrology and Water Quality | City of San Rafael Community Development Department | Construction scheduled to commence in 2021 and be complete by early 2022. |
| **San Rafael General Plan 2040** | City of San Rafael | San Rafael's vision for its future, including policies for the future growth and conservation of the city. The Final EIR for the project was made available on May 23, 2021. | Citywide | Air Quality, Biological Resources, Cultural Resources, Hydrology and Water Quality, Transportation | City of San Rafael Community Development Department | Adopted August 2021 |

**TABLE 3.1-1 (CONTINUED)**
**PROJECTS IN THE VICINITY OF THE PROPOSED PROJECT EVALUATED FOR CUMULATIVE IMPACTS**

| Project Name | Location | Project Description | Distance from the Proposed Project | Potential Cumulative Impact Topics | Lead Agency | Schedule/Status |
|---|---|---|---|---|---|---|
| **San Rafael Creek Operations and Maintenance** | Across-the-Flats Channel in San Francisco Bay to the mouth of San Rafael Creek | A seven-year cycle for maintenance dredging to a depth of -8 feet MLLW for the Across-the-Flats Channel in San Francisco Bay to the mouth of San Rafael Creek, and a four-year cycle for maintenance dredging to a depth of -6 feet MLLW for the Inner Canal Channel to the head of navigation at the Grand Street Bridge in the city of San Rafael.<br>The Inner Canal and Across-the-Flats Channels were last dredged in Fiscal Year 2012 to a depth of -5 feet MLLW, with placement of the dredged material at the San Pablo Bay Disposal Site (SF-10), an unconfined aquatic disposal site. | Approximately 0 to 5 miles north and east of Tiscornia Marsh | Air Quality, Biological Resources, Hydrology and Water Quality | U.S. Army Corps of Engineers | In March 2020, the San Rafael Creek Operations and Maintenance Project was awarded $1,378,000 in federal funds for the first step in dredging: the environmental testing and preliminary design for full dredging. |
| **Hampton Inn and Suites** | 1075 Francisco Boulevard East | The proposed Hampton Inn and Suites Project is for a 185-room hotel and includes guest rooms and guest amenities including a breakfast dining area, meeting rooms, swimming pool, fitness room, guest laundry area, and market. The structure is a contemporary architectural style comprised primarily of aluminum, wood panels, and white plaster. Landscaping will be provided throughout the site including along all property lines and within paved parking areas. The project will include 195 parking spaces for this project. | Approximately 1 mile southwest of Tiscornia Marsh | Air Quality, Greenhouse Gas Emissions, Transportation | City of San Rafael | Approved, construction schedule unknown |

NOTES: EIR = environmental impact report; MLLW = mean lower low water

SOURCE: Data compiled by Environmental Science Associates in 2021

## 3.1.5 References

No references are cited in this section.

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# 3.2 Aesthetics

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to aesthetics and visual resources, and presents an analysis of impacts of the Proposed Project on those resources. City best management practices and mitigation measures to avoid or reduce significant impacts are also identified when needed.

## 3.2.1 Environmental Setting

Visual or aesthetic resources are generally defined as both the natural and built features of the landscape that contribute to the public's experience and appreciation of the environment. The physical aesthetic setting therefore encompasses any area in the Project vicinity from which there are scenic views that could be affected by the Project. Depending on the extent to which a project's presence would alter the perceived visual character and quality of the environment, a visual or aesthetic impact may occur. This discussion defines key terms used in the aesthetics evaluation and describes the Project site and vicinity in terms of their scenic resources.

### Concepts and Terminology

*Visual character* is a general description of the visual attributes of a particular setting. The purpose of defining the visual character of an area is to provide the context within which the viewing public is likely to perceive the visual quality of a particular site or locale. For urban areas, visual character is typically described on the neighborhood level, or in terms of areas with common land use, development intensity, and/or urban design features. For natural and open space settings, visual character is most commonly described in terms of areas with common landscape attributes (e.g., landform, vegetation, water features).

*Visual quality* is defined as the overall visual impression or attractiveness of a site or locale as determined by its aesthetic qualities (such as color, variety, vividness, coherence, uniqueness, harmony, and pattern).

*Scenic vistas* are locations from which the public can experience unique and exemplary views, typically from elevated vantage points that offer panoramic views of great breadth and depth.

S*ensitive viewers* are those who have a strong stake or interest in the quality of the landscape and a greater sensitivity to changes that degrade or detract from the visual character of an area. Examples of sensitive viewers include travelers on designated scenic routes, park visitors, cyclists, pedestrians, and tourists. With respect to lighting and glare, sensitive viewers may also include people in residential buildings.

*Viewer exposure* addresses the variables that affect the viewing conditions of a site. Viewer exposure considers some or all of the following factors: landscape visibility (ability to see the landscape); viewing distance (proximity of viewers to the project); viewing angle (whether the project would be viewed from a superior, inferior, or level line of sight); extent of visibility

(whether the line of sight is open and panoramic to the project area or restricted by terrain, vegetation, and/or structures); and duration of view.

A *viewshed* is an area of land, water, or other urban or environmental element that is visible to the human eye from a fixed vantage point.

## Visual Study Area

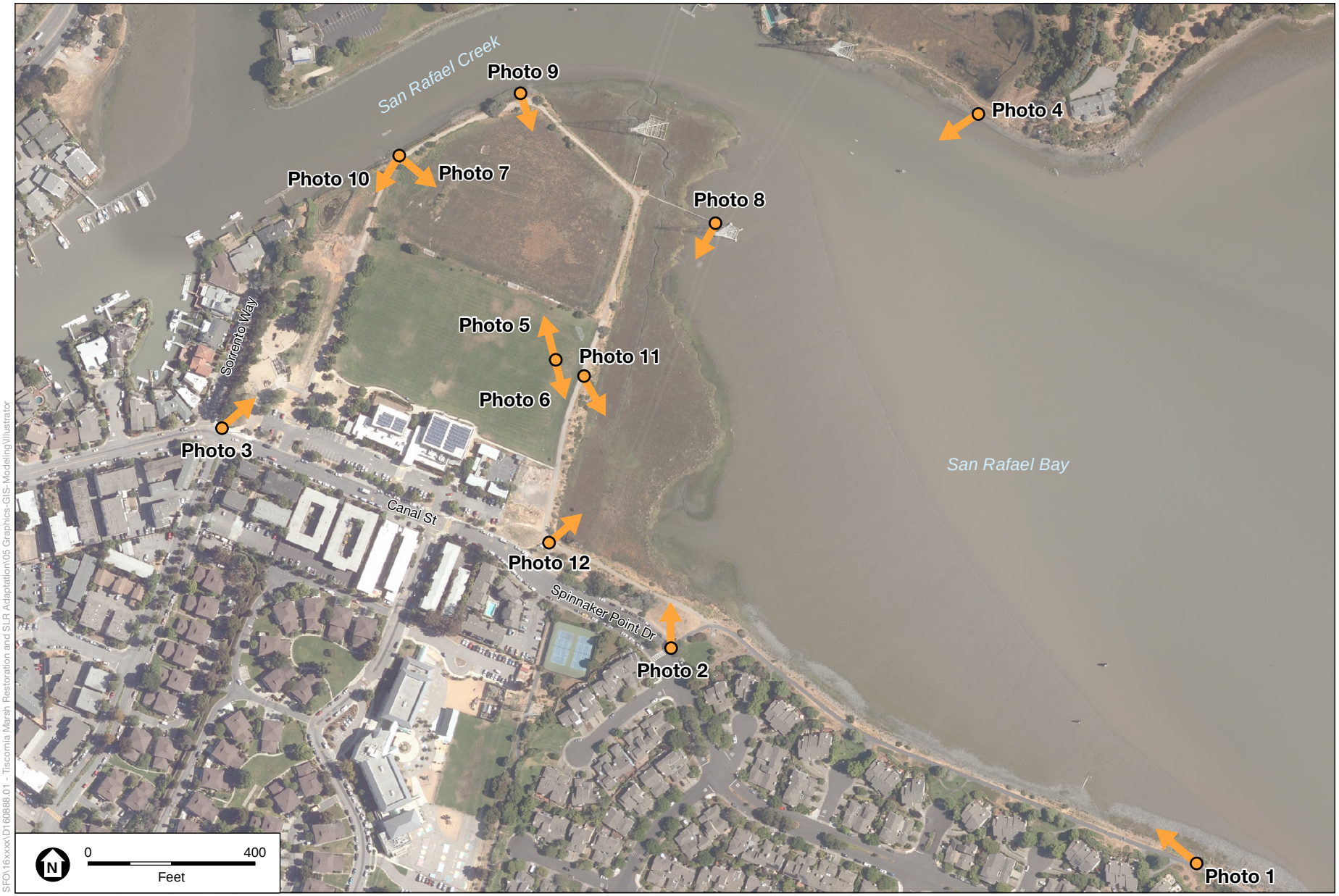
The visual study area for the Proposed Project includes all public areas from which Project components would come into view (e.g., temporary crane platform and other construction and barge offloading equipment for dredge placement, levee improvements, and new levee construction). The Project area is located along San Rafael Creek, in a low-lying marsh area surrounded by residential homes on either side of the waterway, city streets, the Marin Yacht Club (a private yacht club), and the adjacent community center, park, and San Francisco Bay Trail (Bay Trail).

This location offers views of Tiscornia Marsh itself, the adjacent San Rafael Bay and San Rafael Creek, and the Richmond–San Rafael Bridge, as well as views of surrounding hills peppered with residences, and Mount Tamalpais in the distant background. However, topography, trees, shrubs, and residential buildings quickly restrict or block views of the Project site as viewers move away from the site on either side of the creek. Consequently, the visual study area is generally limited to publicly accessible locations on and immediately surrounding the Project site. For example, although the Project site is highly visible from the Bay Trail immediately adjacent to the Project site, the site is no longer visible as soon as the Bay Trail curves around the east side of the Baypoint neighborhood. Similarly, intervening residences, fencing, and vegetation obstruct views of the Project site from all surrounding public roadways, except adjacent segments of Spinnaker Point Drive and Canal Street, on both sides of San Rafael Creek.

The exact boundaries of the visual study area depend on site conditions (viewshed, structures, topography, and vegetation) and are highly site-specific. Site visits were performed in May and June 2021 to further define and assess the visual study area. During the May 2021 visit, representative photographs were taken to document the existing visual conditions of the Project site. **Figure 3.2-1** displays a map of the photo locations and viewing direction. **Figures 3.2-2**, **3.2-3**, **and 3.2-4** present 12 representative publicly available views of the Project site and adjacent areas, which are used to describe the Project site's visual character in the description of visual character below. The locations of Photos 1 through 4 (Figure 3.2-1) generally delineate the extents of the local viewshed, and thus, the visual study area.

## Visual Character of the Project Area

The Project site is located just north and adjacent to the densely populated Canal neighborhood of central San Rafael, at the mouth of San Rafael Creek where it meets San Rafael Bay. The visual character of the Project site and adjacent areas reflects the mix of urban public utility, recreational, and residential land uses in the vicinity: the Albert J. Boro Community Center and Pickleweed Park and adjoining soccer field and children's playground, public open space across the creek and along




SFO\16xxxx\D160888.01 - Tiscornia Marsh Restoration and SLR Adaptation\05 Graphics-GIS-Modeling\Illustrator

SOURCE: ESRI Imagery; ESA, 2021

Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project

**Figure 3.2-1**
Photo Viewpoint Map

ESA

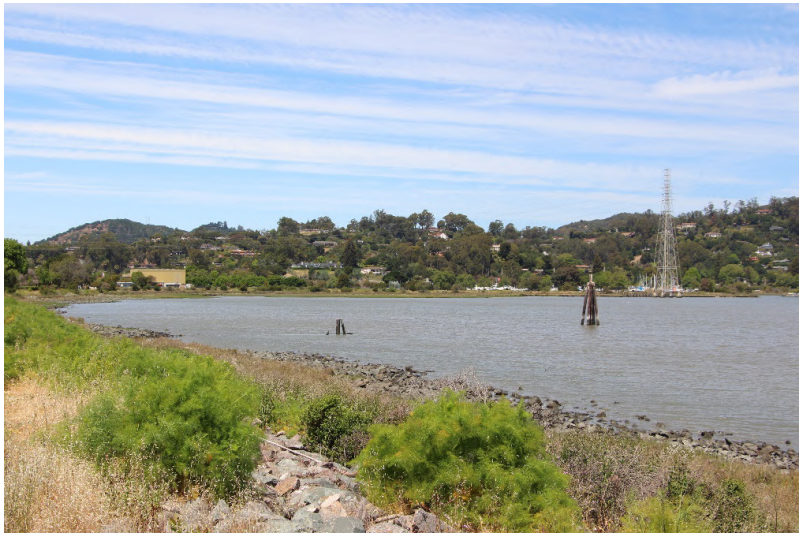


Photo 1 - View of east side of Tiscornia Marsh from the Bay Trail east of the Project Site, on north side of Baypoint Neighborhood

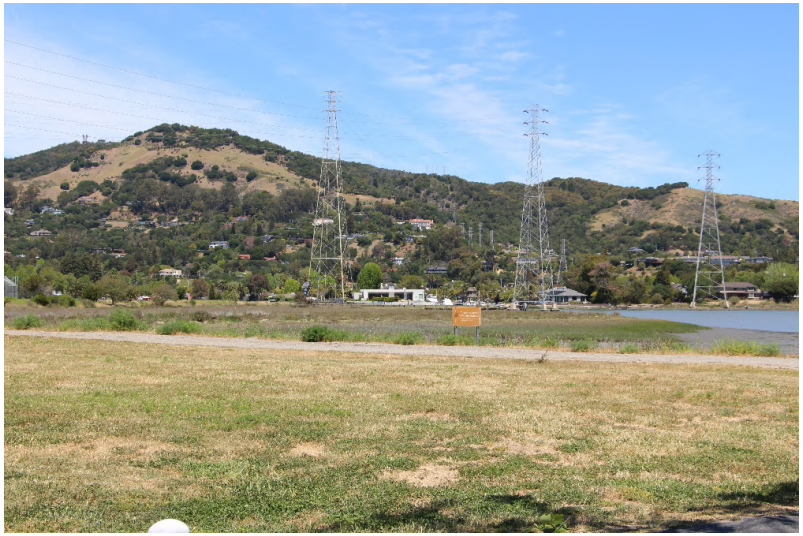


Photo 2 - View of Tiscornia Marsh from adjacent Spinnaker Point Drive near the entrance to the Jean and John Starkweather Shoreline Park.

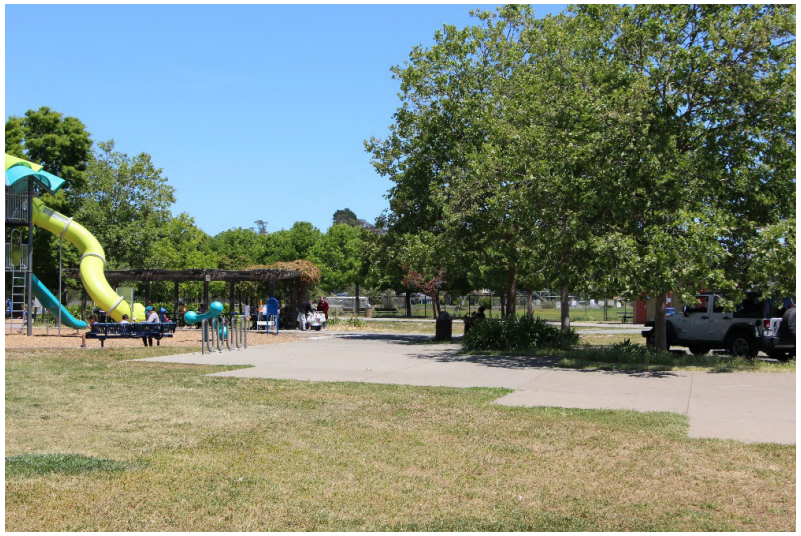


Photo 3 - View from the north side of Canal Street at Kerner Boulevard, looking over the children's playground on the west side of the existing soccer fields toward the Project Site.

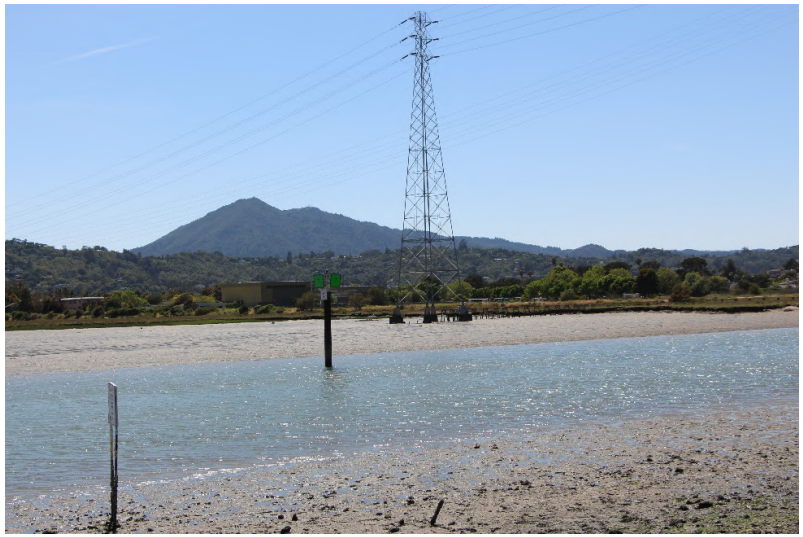


Photo 4 - View of the Project Site from the public open space and trail on the north side of the Canal (opposite the Project Site).

SOURCE: ESA, 2021

Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project

**Figure 3.2-2**
Photos of the Project Site from Nearby Public Vantage Points

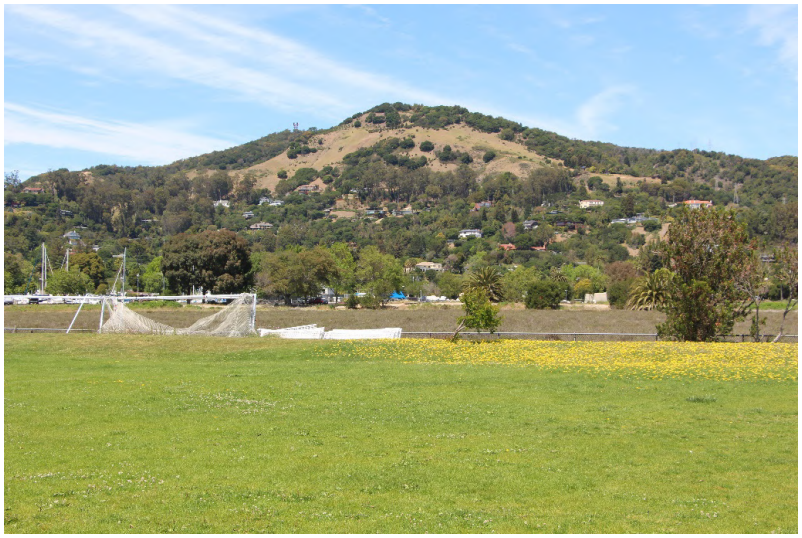


Photo 5 - View from the existing soccer field, facing north toward the diked marsh, where the new levee would be constructed.

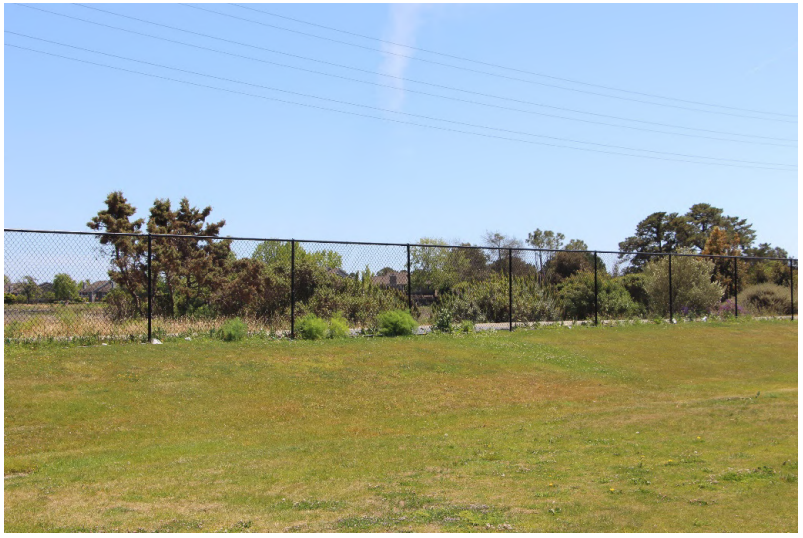


Photo 6 - View from the existing soccer field facing east-southeast toward the field's perimeter fencing and Tiscornia Marsh.

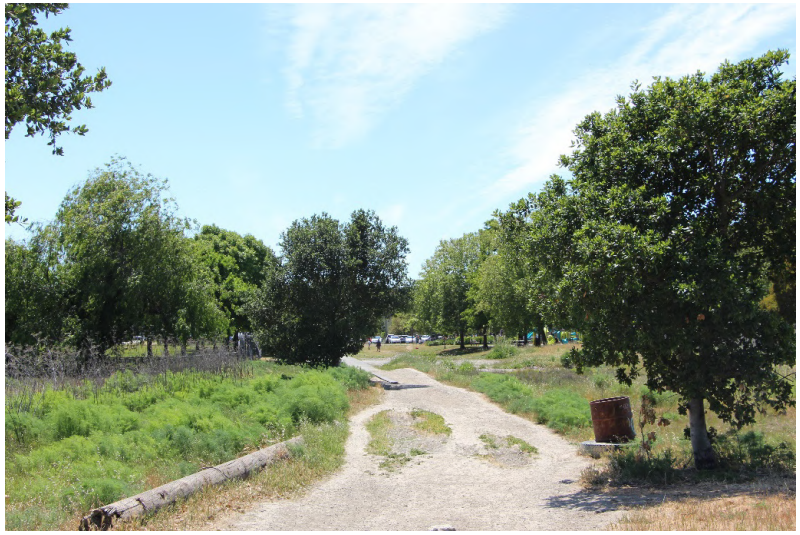


Photo 7 - View from the existing trail on the western segment of perimeter levee around the diked marsh, facing southwest toward the City-owned pond.

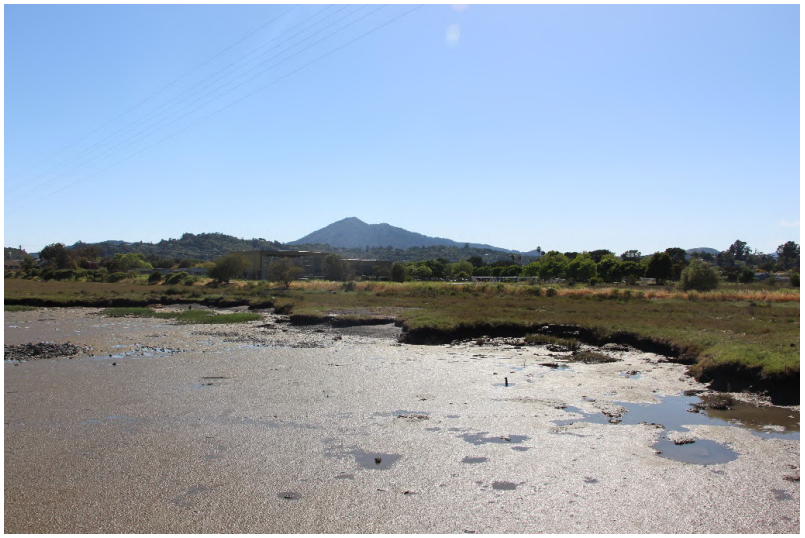


Photo 8 - View from the access ramp to the easternmost PG&E tower on the Project Site, looking toward the mudflat and eroded Tiscornia Marsh edge.

SOURCE: ESA, 2021

Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project

**Figure 3.2-3**
Photos of the Project Site from Existing Public Spaces on and Adjacent to the Project

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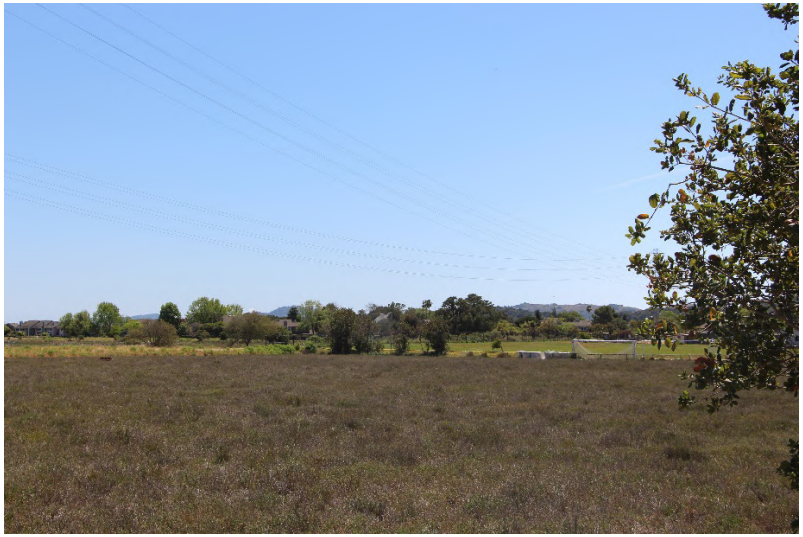

Photo 9 - View over the diked pickleweed marsh toward the soccer fields, from the tip of the existing perimeter levee around the diked marsh.

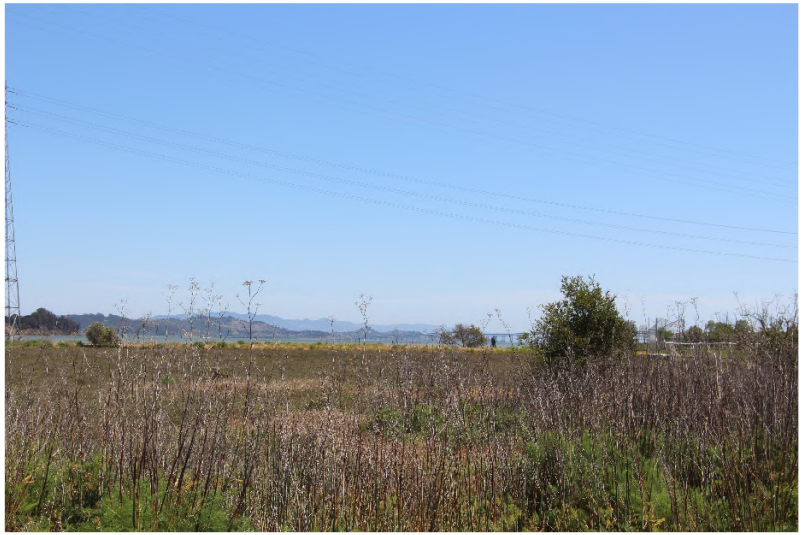

Photo 10 - View over the diked pickleweed marsh toward Tiscornia Marsh, from the water's edge of the perimeter levee as it turns from the west side ofthe marsh to the north.

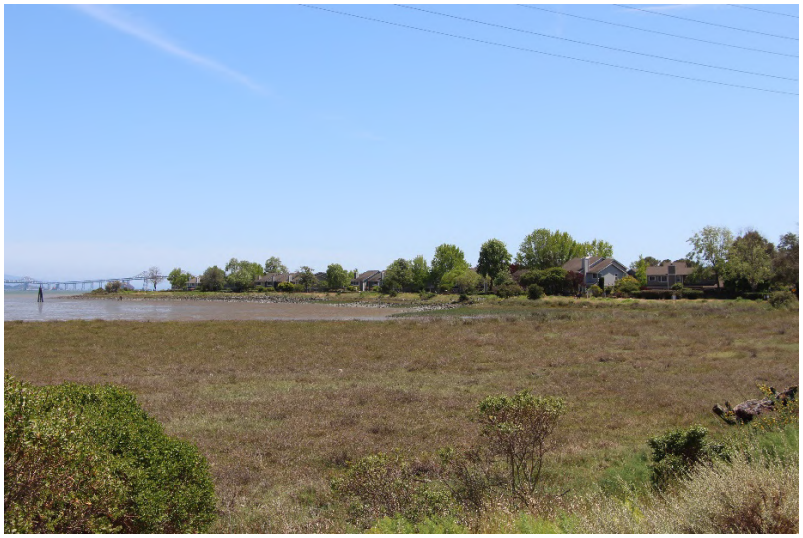

Photo 11 - View over Tiscornia Marsh east, from the levee trail on the east side of the existing soccer field.

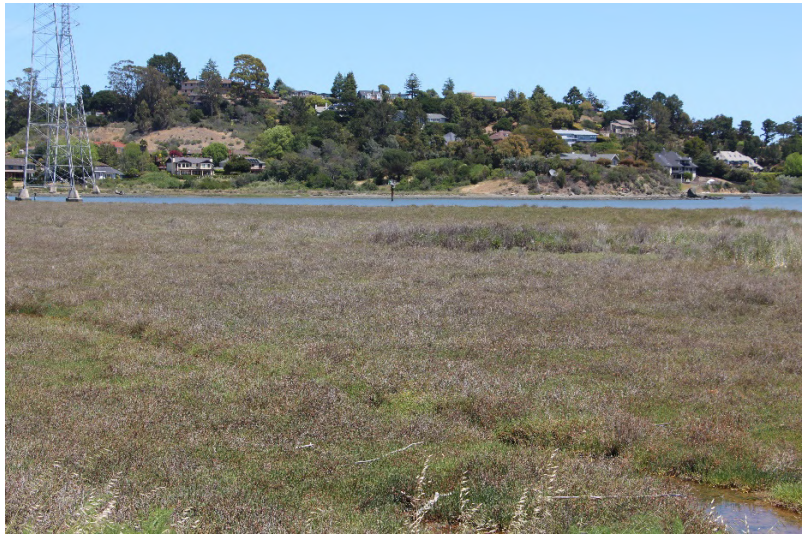

Photo 12 - View over Tiscornia Marsh from the levee trail on the southwest side of Tiscornia Marsh, just before it turns to the south side of Tiscornia Marsh.

SOURCE: ESA, 2021

Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project

**Figure 3.2-4**
Photos from the Project Site of On-Site and Adjacent Features

ESA

the Bay Trail system, the Marin Yacht Club, private residential homes, and Pacific Gas and Electric Company (PG&E) infrastructure. One can view both naturalistic features (e.g., Tiscornia Marsh, vegetated hills, shoreline trails) and built features (e.g., a public playground, soccer field, transmission towers, residential buildings) in close proximity and in the far distance.

As the photographs in Figures 3.2-2 through 3.2-4 demonstrate, open views through the Project site and immediate vicinity provide scenic vistas with views of Mount Tamalpais, the Richmond–San Rafael Bridge, and hills and ridgelines, and of the marsh ecosystems on the Project site itself. The visual quality of the Project area is generally high, defined by the vivid colors of the marsh, vegetated hills, and nearby residences, as well as the localized dynamic shifts between built and natural features and the aesthetic variety that creates. However, as the photographs in these figures also demonstrate, vegetation and structures sometimes obstruct or partially obstruct views of the Project site even from very close by (e.g., Photo 3); PG&E transmission towers sometimes disrupt the continuity of scenic views (e.g., Photo 4); and the area's hilly topography often draws the viewer's eyes up and away from the low-lying Project site itself (e.g., Photos 2, 5, and 8).

### *Views of the Project Site from Nearby Public Vantage Points*

Approaching the Project site from the east along the Bay Trail (Photo 1) or from Spinnaker Point Drive (Photo 2), the Project site is highly visible but is not the focus of the view. The viewer's eyes are drawn up and away from the low-lying marsh vegetation and trails toward the PG&E towers in the middleground and the vegetated hills in the background.

From just southwest of the Project site at the children's playground (Photo 3), the viewer can see the nearby soccer fields and may be able to make out the area designated for construction equipment storage and where the west side of the new levee would tie in to the shoreline. However, in this location, the vast majority of the Project site is obstructed from view by vegetation and there is not an open or expansive view past the immediate surroundings.

From the public open space across San Rafael Creek (Photo 4), which also approximates a view of the Project site from the bay waters at the mouth of the creek, the Project site is again highly visible, but it is not the focus of the view. The viewer's eyes are drawn to the looming Mount Tamalpais in the background, to the disruption created by the PG&E tower in the middleground, and then perhaps to the light-refracting water itself; but neither the marsh and mudflat nor the levees of the Project site (or even the soccer field) stand out.

It can be noted from Photos 1 through 4 that the Project site does not provide gathering places (e.g., park benches, picnic tables) that encourage static and contemplative viewing of the site. Rather, recreationists and other viewers of the Project site would be moving past or through the site on trails, sidewalks, or via boat, or would be engaged in play and supervision activities at the children's playground.

### *Views from Public Vantage Points On and Adjacent to the Project Site*

Figure 3.2-3 presents a series of photographs of the Project site from existing public spaces on and adjacent to the site. Photo 5 depicts a view from the existing soccer field behind the Albert J.

Boro Community Center and Pickleweed Park, facing north toward the diked marsh. The location shown in the middleground, on the northern extent of the soccer field, is where the new levee would be constructed under the Proposed Project. As one can see, the viewer's eyes are immediately drawn to the large, looming vegetated hill in the background, and to the vegetation in the middleground. The diked marsh is somewhat visible, but it is partially obstructed by the ridge along the north side of the field, which even blocks much of the fence line from view.

Photo 6 is another view from the soccer field, this time facing east-southeast toward the existing Tiscornia Marsh. The view of the low-lying marsh from this vantage point is blocked by vegetation, the intervening fence line, and mainly by the sloped rise of the field up to the fence line and trail. Viewers from these vantage points would be focused on playing soccer or observing a soccer match, and perceiving visual or scenic resources would not be their main objective.

The City-owned pond is visible in the right-side middleground of Photo 7, which was taken from the existing trail on the western segment of the perimeter levee around the diked marsh, facing southwest directly along the trail. This view is also representative of what a viewer would see of the west side of the Project site from a passing boat on San Rafael Creek, as its location is only 25 feet from the shoreline. As one can see from Photo 7, the pond is not a focus of this view, particularly because viewers would be moving past this vantage point while hiking or boating, rather than standing still. The view from this point is dominated by the marsh vegetation and trees on either side of the trail, in the foreground, middleground, and background, which frame the trail as the central feature. This view is not particularly scenic or expansive; the scenic quality of this view is instead derived from the vivid colors of vegetation.

A view over Tiscornia Marsh looking toward the Albert J. Boro Community Center and Pickleweed Park is presented in Photo 8, which was taken from the access ramp to the eastern on-site PG&E tower but also approximates a view one would see if traveling via boat into or out of the creek from San Rafael Bay. Mount Tamalpais is in the background, but the foreground features take precedence over other views of the mountain; the highly eroded marsh edge appears in sharp relief, and the mudflat appearing in the immediate foreground is less visually appealing than other features in view.

### *Views from the Project Site of On-Site and Adjacent Features*

Photos 9 and 10 in Figure 3.2-4 present two different views from the perimeter trail (that would be breached or degraded as part of the Proposed Project) over the diked pickleweed marsh toward the existing soccer field and toward the existing portion of Tiscornia Marsh. These views approximate views one might see from San Rafael Creek off the northwestern side of the currently diked marsh. These views show that the diked marsh appears relatively expansive in relation to other parts of the Project site; portions of the slightly elevated soccer field are visible, but Tiscornia Marsh is not. The visual quality of these views comes from the presence of marsh vegetation in the foreground and the distant vegetated hills in the background.

Photos 11 and 12 show two different views from the levee trail on the east side of the Project site: one from the east side of the soccer field (Photo 11) and one from the southwest corner of

Tiscornia Marsh, just before the trail turns to the south side of the marsh (Photo 12). From the vantage point shown in Photo 11, the marsh vegetation fills a portion of the view, but the viewer's eyes are drawn to the visual line created by the Richmond–San Rafael Bridge in the background, blending into the line of the cobbled shoreline and residential homes lining the shoreline in the middleground. Looking the other way over Tiscornia Marsh toward the northeast (Photo 12), the marsh vegetation offers some visual quality, but again, the eyes are mainly drawn to the colors, variety, and contrast of the vegetated and populated hill in the background.

#### *Light and Glare at the Project Site*

Lighting in the immediate Project area comes from a mix of natural and built sources, given the surrounding urban environment. Nighttime lighting near the Project site includes overhead street lights in the community center parking lot and along Spinnaker Point Drive/Canal Street, headlights from passing cars on Spinnaker Point Drive/Canal Street and from boats passing in San Rafael Bay and San Rafael Creek, and light from residential buildings along Spinnaker Point Drive/Canal Street. Lighting is also provided from homes across the creek at the end of Summit Avenue and Sea Way, and from docked boats at the Marin Yacht Club.

## 3.2.2 Regulatory Setting

### Federal Regulations

No federal regulations related to aesthetic resources are applicable to the Proposed Project.

### State Regulations

#### *California State Scenic Highway Program*

The California Department of Transportation (Caltrans) designates highways as scenic highways based on how much of the landscape can be seen by travelers, the scenic quality of the landscape, and the extent to which views are compromised by development. There are no state-designated scenic highways in Marin County (Caltrans 2021); however, portions of U.S. Highway 101 (U.S. 101), State Route (SR) 1, and SR 37 in Marin County are identified as eligible state scenic highways. The eligible portions of U.S. 101 and SR 37 are located more than 8 miles north of the Project site, and SR 1 is more than 10 miles west of the Project site at its closest point. The Richmond–San Rafael Bridge (Interstate 580), located approximately 2 miles away and visible from the Project site, is not designated or eligible for listing as a state scenic highway.

### Local Plans and Policies

#### *The City of San Rafael General Plan 2020*

*The City of San Rafael General Plan 2040* (General Plan 2040), adopted in 2021, serves as the current general plan for the City. The General Plan 2040 sets forth policies for conservation and development and outlines specific programs and actions for implementing these policies. According to the General Plan 2040, the major features that create the City's visual character are

local hills and ridgelines, the bay, creeks and wetlands, San Rafael Creek, tree cover, transportation corridors, neighborhoods, and downtown San Rafael (City of San Rafael 2021).

Aesthetic resources policies in the plan focus on preservation of hillside and ridgeline views and setbacks from open waters, such as San Rafael Creek and San Rafael Bay. These policies are incorporated into the Neighborhoods Element, Community Design Element, and Open Space Element of the General Plan 2040. The following policies and programs are relevant to the location and context of the proposed Project's visual impacts analysis:

> ***Policy NH-3.2. San Rafael Canal.*** Promote the San Rafael Canal as a community-wide asset for public and marine related uses. Public access and views of the water should be improved, and sensitive wildlife habitat should be protected.
>
> > *Program NH-3.2A: Design Plan and Vision for the Canalfront.* Continue implementation of the Canalfront Conceptual Design Plan, including circulation and access improvements and development of a waterfront paseo.
>
> ***Policy NH-3.5: Waterfront Design.*** Require new buildings along the Canal waterfront to provide public views of the water and accommodate public access to the shoreline. Design factors important in reviewing specific development proposals include pedestrian access, waterfront setbacks, view protection and enhancement, habitat protection, architectural design quality, and landscaping.
>
> > *Program NH-3.5A: Canalfront Design Guidelines*. Use the development review process to implement the 2009 Design Guidelines for the Canal Waterfront, including requirements for a 25' waterside setback for new buildings and a 10' paseo along the waterfront. Amenities such as seating, lighting, and bike racks should be provided along the shoreline. The Design Guidelines include provisions for building materials, architecture, lighting, signage, views, public open space, landscaping, street furniture, streets and sidewalks, and sustainability.
>
> ***Policy CDP-1.2: Natural Features.*** Recognize and protect the key natural features that shape San Rafael's identity, including the Bay, local hills and ridgelines, creeks and wetlands, tree cover, and views of Mt. Tamalpais and other natural landmarks. Height limits and other building standards should respect San Rafael's natural topography and reinforce its sense of place, including the character and boundaries of individual neighborhoods.
>
> ***Policy CDP-1.4: Waterfront Identity.*** Strengthen San Rafael's identity as a waterfront city, providing improved visual and physical access to San Pablo Bay, San Rafael Bay, and the San Rafael Canal.
>
> > *Program CDP-1.4A: Canalfront Design Plan.* Implement the Canalfront Conceptual Design Plan (2009) recommendations. Development near the shoreline should maximize views to the water and public access to the shoreline.
>
> ***Policy CDP-1.5: Views.*** Respect and enhance to the greatest extent possible, views of the Bay and its islands; wetlands, marinas, and canal waterfront; hillsides and ridgelines; Mt. Tamalpais; Marin Civic Center; and St. Raphael's bell tower; as seen from streets, parks, and public pathways.

***Policy PROS-3.1: Open Space Frame*.** Retain and protect San Rafael's open space frame, including open space on the city's perimeter and the network of open spaces that define and connect the city's neighborhoods. Open space should be recognized as essential to wildlife, environmental and human health, psychological well-being, and as a natural means of separating communities, preventing sprawl, and providing visual relief.

*Program PROS-3.1A: Criteria for Open Space Protection*. Use the following criteria for identifying and prioritizing open space parcels for future protection (the criteria are not listed in any particular order):

… b. Aesthetics (visual backdrop or edge, unique site features, shorelines, ridgelines)…

### *Canalfront Conceptual Design Plan*

In 2009, the City completed the Conceptual Design Plan for the segment of San Rafael Creek informally known as the San Rafael Canal (City of San Rafael 2009). The plan recognizes this segment of the creek as a defining feature of San Rafael that provides recreational, aesthetic, and environmental benefits. Among the recommendations are development of a waterfront paseo from downtown to Pickleweed Park on the south bank, and along the Montecito waterfront on the north bank. The plan envisions a thriving Canalfront with maritime presence, sailing, boating, rafting, kayaking, and fishing, and where habitat for birds and plants is restored, creating a healthier ecosystem.

Compatibility with the Canalfront Conceptual Design Plan is relevant to visual resources because of the aesthetics-related General Plan Policy CD-5a, listed above. The Project site lies within the Pickleweed Park area of the plan, and is near the Canal Street area of the plan. The following recommendations of the plan for both of these areas are relevant to the visual context and analysis of aesthetic resources at the Project site:

**Canal Street Recommendations:**

- Develop a continuous publicly accessible pedestrian walkway on the waterfront as opportunity arises.

**Pickleweed Park Recommendations:**

- Provide a path accessible for maintenance vehicles and pedestrians around the perimeter of Pickleweed Park, while also maintaining the natural character of the existing trail.
- Provide seating areas for wildlife observation in Pickleweed Park.
- Enhance habitat along the shoreline and within the park where possible.
- Provide interpretive signage along the Bay Trail path around the waterfront edge of Pickleweed Park.

## 3.2.3 Impacts and Mitigation Measures

### Significance Criteria

The criteria used to determine the significance of impacts related to aesthetics are based on Appendix G of the CEQA Guidelines. The Proposed Project would have a significant impact if it would:

- Have a substantial adverse effect on a scenic vista.
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.
- In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings (public views are those that are experienced from publicly accessible vantage points), or, if the project is in an urbanized area, conflict with applicable zoning and other regulations governing scenic quality.
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

### Approach to Analysis

The aesthetic resources impact analysis is based on field observations conducted by Environmental Science Associates in May and June 2021; review of Project maps and drawings; aerial and ground-level photographs; and review of a variety of data in the record, such as local planning documents. The analysis identifies potential temporary (short-term) and permanent (long-term) Project impacts on scenic vistas; on scenic resources (those occurring within a state-designated scenic highway corridor); and on the visual character and quality of the Project site as seen from public urban locales, recreational facilities, and open space areas. The analysis does not address aesthetic changes to views from private residences, private roads, or the private Marin Yacht Club.

With respect to analysis of effects on aesthetic character and quality, San Rafael is considered an urbanized area, as defined in CEQA Guidelines Section 15387, and as mapped by the U.S. Census (U.S. Census Bureau 2012). As discussed in Section 3.2.2, *Regulatory Setting*, no federal or state policies regulating visual resources would apply to the Project, but there are relevant local plans and policies. The analysis below considers the potential for the Project to conflict with these plans and policies.

#### *Construction Impacts*

The evaluation of temporary visual impacts considers whether Project construction activities could substantially degrade scenic vistas, scenic resources, and the lighting environment.

#### *Operational Impacts*

Permanent visual impacts are assessed based on the Project's potential to substantially alter scenic resources (e.g., by removing trees and other landscaping, raising levees), alter the urban

recreation landscape in a manner that would adversely affect a scenic vista, or create excessive glare or nighttime lighting that would adversely affect those sensitive to the effects of light and glare.

## Topics Considered and Determined to Have No Impact

The following topics are considered to have no impact based on the Proposed Project's characteristics, its geographical location, and/or underlying site conditions. Therefore, these topics are not addressed further in this document for the following reasons:

- ***Degradation of existing visual character or quality of public views of the site and its surroundings in non-urbanized areas:*** The Project site is within the limits and jurisdictional boundaries of the City of San Rafael. San Rafael is considered an urbanized area as defined in CEQA Guidelines Section 15387, and as mapped by the U.S. Census (U.S. Census Bureau 2012). It is adjacent to residential land uses of the Canal neighborhood and a popular community center and park owned by the City. The Project site is located in an urbanized area; therefore, relative to an examination of visual character or quality of public views in a non-urbanized area, the Project would have no impact.
- ***Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway:*** There are no designated state scenic highways in Marin County (Caltrans 2021). Portions of U.S. 101, SR 1, and SR 37 have been identified as eligible for listing; however, the eligible portions of U.S. 101 and SR 37 are located more than 8 miles north of the Project site, and SR 1 is more than 10 miles west of the Project site at its closest point. The Richmond–San Rafael Bridge (Interstate 580), located approximately 2 miles away and visible from the Project site, is not designated or eligible for listing as a state scenic highway. Therefore, no scenic highways exist on or within the visual study area of the Project site, and the Project would have no impact on scenic resources within a state scenic highway.

## Impact Summary

**Table 3.2-1** provides a summary of Project impacts related to aesthetics.

**TABLE 3.2-1**
**SUMMARY OF AESTHETICS IMPACTS**

| Impact Statement | Construction | Operation |
|---|---|---|
| **Impact 3.2-1:** The Project would not have a substantial adverse effect on a scenic vista. | LTS | LTS |
| **Impact 3.2-2:** The Project would not conflict with applicable zoning and other regulations governing scenic quality. | LTS | LTS |
| **Impact 3.2-3:** The Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. | LTS | LTS |
| **Impact 3.2-4:** The Project, combined with other reasonably foreseeable future projects in the Project vicinity, would not result in significant cumulative impacts related to aesthetics or visual resources. | LTS | LTS |

NOTE: LTS = less than significant

## Impact Analysis

**Impact 3.2-1: The Project would not have a substantial adverse effect on a scenic vista. (*Less than Significant*)**

### Construction

Implementation of the Proposed Project could cause temporary construction-related impacts on scenic vistas. The Project would require construction of a coarse beach feature, levee raising and construction, and mechanical placement of on-site excavated and imported material into the eroded tidal marsh area to be restored. It would also require site preparation activities (e.g., installation of a temporary crane platform and access roads, vegetation removal) and demobilization activities (e.g., removal of temporary roads, culverts, and equipment, and seeding and planting).

This work would require various pieces of construction equipment, such as excavators, bulldozers, trucks, compactors, and a tugboat and barge. This equipment would be stored on-site during construction of the Project, which would occur approximately six months out of the year over the three-to-four-year construction period. The location of staging and storage areas, access routes, and the crane platform can be seen in Figure 2-5.

As discussed previously in the *Visual Study Area* section, the viewshed around the Project site is limited by topography, trees, shrubs, and residential buildings, which quickly restrict or block views of Proposed Project components as viewers move away from the site, on either side of San Rafael Creek. Consequently, much of the Project construction activities and equipment would not be visible from public streets or other public vantage points.

Public views of construction activities would be further limited by closures of the shoreline trails at the Project site. (Figure 2-5 shows the construction access routes that would lead to trail closures during the construction season.) Recreationists and other visitors to the Project area whose views of the Project site could be affected are therefore limited to the following:

- Recreationists and other visitors who would approach from the Bay Trail or Spinnaker Point Drive from the north side of the Spinnaker Point/Bay Point neighborhood (Figure 3.2-2, Photos 1 and 2).
- Users of the Albert J. Boro Community Center and Pickleweed Park and associated soccer field and children's playground (Figure 3.2-2, Photo 3; Figure 3.2-3, Photos 5 and 6).
- Boaters traveling by the Project site in San Rafael Bay or San Rafael Creek (Figure 3.2-3, Photos 7 and 8; Figure 3.2-4, Photos 9 and 10).
- Users of the public open space on the north side of the creek (Figure 3.2-2, Photo 4).

All these viewers would be moving past or through the site as they boat or hike, or would be actively engaged in activities on the playground or soccer field. The Project site does not include gathering places (e.g., park benches, picnic tables) that encourage static, contemplative viewing of the site.

Although Project construction activities would be visible to viewers approaching the site from the east, the construction equipment in the marsh or on the levee trails would not be the focal point of their view, as discussed previously in the *Visual Character of the Study Area* section. The viewer's eyes are drawn up and away from the low-lying marsh vegetation and trails toward the PG&E towers in the middleground and the vegetated hills in the background. The crane (when present) would likely be the most visible feature, but would be minimized in comparison to the large transmission towers and expansive hills in the background.

For users of the community center, soccer fields, and playground, most views of the Project site would be blocked as well. From the children's playground, the only portion of the Project site that a viewer would likely see is the equipment staging area, but this would be highly obstructed by the surrounding vegetation. The most exposed viewers would be those using the soccer field; however, as discussed in the *Visual Character of the Study Area* section, views from the soccer field toward the location of proposed new levee construction are dominated by the vibrant, vegetated hill in the background to the north, and views of Tiscornia Marsh are obstructed by vegetation to the east. The partially obstructed surrounding marsh areas are not the focus. Construction equipment would be visible during construction of the new levee and during levee improvement activities, given the close proximity, but this work would occur over a single construction season and the remaining Project construction activities would be relatively screened from view. In addition, users of the children's playground and the soccer field would be present for specific purposes: playing or supervising children on the playground, or playing or watching a soccer match on the field. These activities, not the perception and enjoyment of specific views or vistas, would be the focus of attention.

As for those traveling by boat who may catch views of the Project site from San Rafael Creek or San Rafael Bay, the viewpoint would not be static, but rather would be consistently changing as the boat passes by. Depending on their position at any given moment, boaters might see views of the west levee tie-in work (Photo 7); views of the new levee construction beyond the diked marsh, perimeter levee degrade work, or diked marsh restoration activities (Photos 9 and 10); or views of the eroded Tiscornia Marsh and dredge placement activities (Photo 8).

As discussed in Section 2.2.4, *Shoreline Levee Improvements*, in Chapter 2, *Project Description*, there are two potential options for the west levee tie-off, both of which would partially fill the City-owned pond. Under option 1, the north side would be filled to allow the 4 feet of shoreline levee raising at this location required to meet the new levee's design elevation; under option 2, the south side of the pond would be filled to allow for the extension of the new levee to meet the shoreline.

In either case, as one can see from Photo 7, the pond is not a focus of this view. The view from this point is dominated by the marsh vegetation and trees on either side of the trail, which frame the trail as the central feature. Construction activities would occur on this section of levee trail as well (either raising this portion of levee under option 1 or degrading it under option 2), but this view is not particularly scenic or expansive. Some visual appeal can be derived from the vivid colors of the vegetation, but the trees screen views past the immediate foreground.

In Photos 9 and 10, views that a boater might see while moving toward the tip of the perimeter levee, the diked marsh appears relatively expansive compared to other parts of the Project site; portions of the slightly elevated soccer field are visible, but Tiscornia Marsh is not. The visual focus of these views is on the expanse of marsh vegetation in the foreground and the distant vegetated hills in the background; the middleground blends together beyond the diked marsh in a mix of vegetation, fence line, and field equipment (i.e., the soccer goal). From this vantage point, work in the diked marsh, such as tidal channel excavation, would be highly visible, but work beyond the marsh, such as construction of the new levee, would not stand out. Diked marsh restoration activities would require a relatively light construction footprint, involving five pieces of equipment over approximately seven equipment-days to lower the existing levee, and five pieces of equipment over approximately five equipment-days to excavate the tidal channel. These activities would occur relatively quickly over a single construction season; further, views by boaters passing by would be relatively fleeting, and viewers would be distracted by the task of driving and viewing the changing landscape and movement around them.

Similar to the views over the diked marsh discussed above, Photo 8 presents a view that a boater may have over Tiscornia Marsh, looking toward the Albert J. Boro Community Center and Pickleweed Park, if traveling via boat into or out of the creek from San Rafael Bay. Mount Tamalpais is in the background, but the foreground features take slight precedence over other views of the mountain, as the highly eroded marsh edge appears in sharp relief, and the expansive mudflat appearing in the immediate foreground is less visually appealing than other features in view and distracts from them. All activities involved in the reconstruction of Tiscornia Marsh (e.g., construction of the coarse beach, dredge placement, tidal channel excavation) would be highly visible from this viewpoint. However, as mentioned above, views by boaters passing by would be fleeting, and boaters would be distracted by driving their boats, looking toward their destinations, and viewing the many scenic hillsides around them on either side of the creek.

From the public open space across San Rafael Creek, the viewer's eyes are drawn to the enormity of Mount Tamalpais in the background and then to the disruption created by the PG&E tower in the middleground. Construction in and around the marsh areas and levee trails would be visible, but the distance, the viewer's likely movement as they walk through the open space on the public trail, and the relative scale of the transmission tower and mountain would minimize the Project site's visual distinctness.

There is only a limited number of public vantage points with views onto the Project site that present scenic or panoramic views, and a lack of gathering places for contemplative views of the site. Viewers would be engaged in specific activities (i.e., hiking, boating, playing), and localized screening is present on the site from topography and vegetation. For these reasons, and given the context of the low-lying Project site relative to mountains, hills, and built structures like the Richmond–San Rafael Bridge, Project construction would not have a substantial adverse effect on a scenic vista. This impact would be ***less than significant***.

**Mitigation:** None required.

### Operation

Once completed, the Proposed Project would create new opportunities for visitors to access scenic views within the Project site because the currently graveled shoreline levee trails would be paved and made more accessible. The new and improved levee segments would be approximately 1–4 feet taller than under current conditions, but the main public vantage point where this would be a visible change is from the existing soccer field. As seen in Figure 3.2-3, Photos 5 and 6, raised levees would not significantly alter the view to the north of the expansive hillside communities or the view to the east of the already obstructed Tiscornia Marsh. San Rafael Bay would remain visible beyond the field to the east, as the existing levee along the eastern side of the soccer field would be raised by only about 1 foot, and views of San Rafael Creek (to the north) are already obstructed by the existing perimeter levee. Viewers at this vantage point would be actively engaged in playing or watching a soccer match, moving quickly and focused on the activities taking place on the field, as opposed to the surrounding views.[1]

The existing views of the rest of the site would remain largely unchanged, benefiting from the expanded and restored tidal marsh systems, which would provide superior habitat for a range of native wildlife. From the public open space across San Rafael Creek, if one focused on the Project site rather than the expansive view of Mount Tamalpais, the expanded marsh ecosystem would be visible, as opposed to mudflat. A viewer would be able to see the new levee on the north side of the soccer field, but neither this new location for a levee nor the increased height of the existing levees would alter or block views of the community center, vegetated hills, or mountain from this distance. The coarse beach would be visible as well, but like the levees, it would appear low-lying from this distance. Further, the beach would blend in with the marsh, as it would be planted with high marsh vegetation at the crest and would be constructed to transition gradually to the newly created tidal marsh on its landward side.

Approaching the Project site from the east, along the Bay Trail or Spinnaker Point Drive, the main Project features that would be visibly different are the setback levee and the coarse beach. The setback levee would be closer to Spinnaker Point Drive and raised by 1–4 feet, so the view in Figure 3.2-2, Photo 2, would reflect a less expansive grassy area leading up to the levee toe, which would then slope upward like a linear mound to the levee crest. However, this view would not noticeably differ from existing conditions, as the levee and ecotone in this area would be planted and revegetated and the slight changes in topography would not block views of the prominent hillsides or bay that dominate this perspective. Similarly, the coarse beach would be visible from views along the Bay Trail to the east of the Project site, as represented in Figure 3.2-2, Photo 1; however, this portion of the shoreline is sporadically cobbled, and the beach feature (to be created from cobbles that would be visible from this viewing angle) would blend in to some degree with the existing cobble. The beach feature would not block views of the bay but would block the low-lying marsh from this angle; however, as one can see in Photo 1, the marsh is difficult to see from this distance under existing conditions because of how low it is and its highly eroded state. In general, the entire Project site, including the shoreline levees and soccer fields, is

[1] Preparation of visual simulations was considered for the aesthetics impact analysis but it was concluded to be unnecessary, given the relatively minimal vertical change introduced by Project features and the limited viewpoints from which this vertical change would be visible or obstruct scenic views as discussed in this analysis.

minimized in this view, appearing as a strip of green at the bottom of the tree-covered hillsides in the background. The view from the east would remain focused on the vegetated hillsides in the background and the bay waters in the foreground, just as it is under current conditions.

Approaching from the west, the Project site would remain completely screened from view as it is now, obstructed by vegetation, the fence line, and the community center. Views from the children's playground would similarly remain unchanged, as the west tie-in of the new levee would be obstructed and screened by vegetation and distance.

From the shoreline trails through and along the Project site, once reopened, views would also remain largely unchanged. The levees would be approximately 1–4 feet higher than under current conditions, providing a slightly more elevated and clear view of surrounding vistas to users of the trail system. The coarse beach feature would be visible, particularly from the levee trail on the east side of the Project site; however, this feature would blend into the marsh from this angle, as noted above, because of its gradual slope and the high marsh and marsh vegetation that would cover it. It would appear as a continuation of the marsh due to this vegetative cover, with slight elevation appearing much like a small topographic feature at the far side of the marsh. At approximately 9 feet above sea level, the coarse beach would not be tall enough to block the current views of San Rafael Bay, the shoreline, and the Richmond–San Rafael Bridge from this vantage point, particularly because the trail itself would be raised higher as well.

As for the rest of the trails on-site, rather than using the existing perimeter trail north of the currently diked marsh, hikers would use the new levee trail on the north side of the soccer field, but views of the creek, bay, and surrounding hillsides would remain unaltered by this change. Viewers looking from the new trail across the creek would experience marsh in the foreground, but given the height of the levee trail over the low-lying marsh, views would remain unobstructed.

Boaters passing the Project site as they move along San Rafael Creek or San Rafael Bay would experience some of the changes noted above. Depending on their angle, boaters would perceive an expanded, larger Tiscornia Marsh, less mudflat, a coarse beach feature that blends into the marsh, and a slightly different trail orientation on the west side of the Project site. However, these features would not obstruct views of Mount Tamalpais, the surrounding hills, or other scenic vistas. Much of the view from the water would remain unchanged, as the new levee behind the currently diked marsh would blend into the soccer field, and the view of the diked marsh would remain as is, except that the perimeter levee would be degraded or breached in certain locations.

For the reasons discussed above and, as noted previously, because viewers would be engaging in specific activities (i.e., hiking, boating, playing) as they move past or through the Project site, Project operation would not have a substantial adverse effect on scenic vistas. This impact would be ***less than significant***.

**Mitigation:** None required.

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**Impact 3.2-2: The Project would not conflict with applicable zoning and other regulations governing scenic quality. (*Less than Significant*)**

The Project site is designated in the General Plan 2040 as Parks, Recreation, and Open Space and as Conservation (City of San Rafael 2021) and is zoned as Parks/Open Space, Planned Development, and Water Zoning Districts with a Wetlands Overlay and a Canalfront Review Overlay (City of San Rafael 2021). The General Plan 2040 and Zoning Code outline setback and height requirements for development along the bayfront and Canalfront, and other local regulations governing scenic quality are outlined in the *Local Plans and Policies* section.

The Proposed Project would not reduce setbacks by introducing any structures closer to San Rafael Creek or San Rafael Bay that would impede views. Although levee height would increase by approximately 1–4 feet and the coarse beach would be constructed to approximately 9 feet above sea level, this is much lower than the "low-scale" building development allowed by the site's Canalfront Review Overlay. Further, as discussed above, these features would not obstruct existing views of the area's hillsides, ridgelines, the bay or creek, or other prominent or scenic views in the area. The raised and new levees and the new coarse beach feature would only alter views while viewers are on or directly adjacent to the Project site. Views nearby are screened either by other vegetation or topographic features or by structures, or are dominated by views of hillsides and mountains, where views of the low-lying marsh that may be partially obstructed by these features are not highly visible under current conditions. Views from the public open space across San Rafael Creek, the adjacent soccer field, the surrounding waterways, or from the Project site itself would change to some degree as a result of the raising and reorientation of the levees and installation of the coarse beach, but these components would not alter or obstruct the defining features of the views (e.g., those of mountains, hillsides, San Rafael Bay, and the Richmond–San Rafael Bridge).

Other policies discussed in the *Local Plans and Policies* section call for maximizing the use and views of the water, providing pedestrian access to the waterfront and publicly accessible walkways, protecting wildlife habitat, enhancing bay wetlands and views of the Canalfront, and providing seating areas and signage around Pickleweed Park. The Proposed Project would not conflict with any of these policies. Conversely, by protecting sensitive wildlife areas, enhancing habitat, adding seating and signage to the new trails, encouraging natural vegetation, and improving public access, the Proposed Project would advance the policies and programs set forth in the General Plan 2040 (NH-3.2 and 3.2A, NH-3.5 and 3.5A, CDP-1.2, CDP-1.4 and 1.4A, CDP-1.5, and PROS-3.1 and 3.1A) and the recommendations in the Canalfront Conceptual Design Plan. Therefore, neither construction nor operation of the Proposed Project would conflict with applicable zoning or other regulations governing scenic quality. This impact would be ***less than significant***.

**Mitigation:** None required.

**Impact 3.2-3: The Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. (*Less than Significant*)**

The City of San Rafael has established allowable construction hours in its municipal code, which restricts construction activities to between 7:00 a.m. and 6:00 p.m., Monday through Friday, and between 9:00 a.m. and 6:00 p.m. on Saturdays (Section 8.13.050(A) of the San Rafael Municipal Code). Project construction activities are proposed to occur from approximately 8:00 a.m. to 5:00 p.m., Monday through Friday. The proposed construction hours would not include nighttime work. Construction equipment would be stored at the Project site during the construction season, which would have the potential to create some glare effects from the headlights of passing vehicles; however, the Project site is bordered by residential neighborhoods and local streets (not throughways), and heavy nighttime traffic is therefore not anticipated.

Because Project construction would occur during the daylight hours and would not use portable lighting, and because Project operation does not call for the installation of any permanent lighting, the Project would not create a new source of substantial light or glare that would adversely affect day or nighttime views in the area. This impact would be ***less than significant***.

**Mitigation:** None required.

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## Cumulative Impacts

**Impact 3.2-4: The Project, combined with other reasonably foreseeable future projects in the Project vicinity, would not result in significant cumulative impacts related to aesthetics or visual resources. (*Less than Significant*)**

As explained in Section 3.1.4, *Approach to the Cumulative Projects Scenario and Cumulative Impact Analysis*, the geographic area that could be affected by implementation of the Proposed Project in combination with other projects varies depending on the type of environmental resource being considered. In the case of aesthetic resources, the geographic scope of the analysis for cumulative impacts is limited to the viewshed of the Project site. As stated previously, topography, trees, shrubs, and residential buildings quickly restrict or block views of the Project site as viewers move away from the site, on either side of San Rafael Creek. For example, although the Project components are highly visible from the Bay Trail immediately adjacent to the Project site, they are no longer visible as soon as the Bay Trail curves around the east side of the Spinnaker Point/Bay Point neighborhood. Similarly, intervening residences, fencing, and vegetation obstruct views of the Project site from all surrounding public roadways, except adjacent segments of Spinnaker Point Drive and Canal Street, on both sides of the creek. Therefore, the scope of cumulative impacts in this analysis focuses on the Project site and immediate vicinity (conservatively defined as 0.25 mile from the Project site).

Eight foreseeable projects are planned to begin construction in San Rafael between 2021 and 2025 (Table 3.1-1 in Section 3.1, *Introduction to the Analysis*). Of these eight projects, four are

located within 0.25 mile of the Project site: the Pickleweed Field and Park Project, Schoen Park Conversion to Parking, two of the five locations planned for the Canal Neighborhood Pedestrian Safety Improvements Project, and the San Rafael Creek Operations and Maintenance Project. The Schoen Park Conversion to Parking and Canal Neighborhood Pedestrian Safety Improvements would require minor construction to begin in 2021. Therefore, this construction should be complete before construction of the Proposed Project would begin in 2023, thus negating the chance for a cumulative impact on aesthetic resources to result from implementation of the Proposed Project in combination with these projects.

Construction of the San Rafael Creek Operations and Maintenance Project and the Pickleweed Field and Park Project may occur at the same time as construction of the Proposed Project. The Pickleweed Field and Park Project, adjacent to the Project site, is planned to be constructed between 2021 and 2025. This project would convert the Pickleweed Field to synthetic turf for year-round access and install several other recreation features. It would likely involve the limited use of off-road construction equipment, which from a distance would blend in with the other similar equipment that would be used for the Proposed Project. In addition, construction of this project would necessitate the closure of the soccer field, thus significantly reducing the already limited potential public vantage points of the Project site.

The San Rafael Creek Operations and Maintenance Project would involve dredging the creek to a depth of -8 feet mean lower low water line to the mouth of San Rafael Creek, adjacent to Tiscornia Marsh. This project has no established timeline for dredging activity. This project would likely involve the limited use of dredging equipment and possibly trucks or barges to transport dredged materials. This equipment would be similar to the barge and offloading equipment used by the Proposed Project; further, because this project would occurs throughout San Rafael Creek and San Rafael Bay, equipment would be located adjacent to the Project site for a limited period of time.

For the reasons discussed (timing of the projects, closure of public vantage points, and similar and minor equipment use in comparison to the Proposed Project), the Project, in combination with other projects in the cumulative scenario, would not cause a significant, adverse cumulative impact on aesthetic resources.

**Mitigation:** None required.

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## 3.2.4 References

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# 3.3 Air Quality

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to air quality, including criteria air pollutants (CAPs), toxic air contaminants (TACs), and odors. An analysis of impacts of the Proposed Project on air quality is also provided. The section identifies the appropriate CEQA baseline, then presents a review and summary of the criteria used for determining the significance of environmental impacts, followed by an analysis of impacts relevant to Project implementation. Mitigation measures are also identified, as relevant, to reduce and minimize the intensity of impacts associated with the Project. If needed, Bay Area Air Quality Management District (BAAQMD) best management practices (BMPs) and mitigation measures to avoid or reduce significant impacts are also identified. For a discussion of impacts associated with greenhouse gas (GHG) emissions, see Section 3.5, *Greenhouse Gas Emissions*.

## 3.3.1 Introduction

### Criteria Air Pollutants

The U.S. Environmental Protection Agency (EPA) has identified certain air pollutants that are a threat to public health and welfare. These pollutants are called "criteria" air pollutants because standards have been established for each of them to meet specific public health and welfare criteria (see Section 3.3.3, *Regulatory Setting*). The following CAPs are a concern in the air basin.

#### *Ozone*

Ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections in humans. It can also cause substantial damage to vegetation and other materials, when present in sufficiently high atmospheric concentrations. Ozone is not emitted directly into the atmosphere. Instead, it is a secondary air pollutant that is produced in the atmosphere through a complex series of photochemical reactions involving reactive organic gases (ROG) and nitrogen oxides ($NO_X$). ROG and $NO_X$ are known as precursor compounds for ozone. Significant ozone production generally requires ozone precursors to be present in a stable atmosphere with strong sunlight for approximately three hours.

Ozone is a regional air pollutant because it is not emitted directly by sources, but is formed as a secondary pollutant downwind from sources of ROG and $NO_X$ under the influence of wind and sunlight. Ozone concentrations tend to be higher in the late spring, summer, and fall, when long sunny days combine with regional subsidence inversions to create conditions conducive to the formation and accumulation of secondary photochemical compounds like ozone.

Ozone can cause the muscles in the airways to constrict, potentially leading to wheezing and shortness of breath (EPA 2019a). Ozone can make it more difficult to breathe deeply and vigorously; cause shortness of breath and pain when taking a deep breath; cause coughing and a sore or scratchy throat; inflame and damage the airways; aggravate lung diseases such as asthma, emphysema, and chronic bronchitis; increase the frequency of asthma attacks; make the lungs more susceptible to infection; continue to damage the lungs even when the symptoms have

disappeared; and cause chronic obstructive pulmonary disease (EPA 2019a). Long-term exposure to ozone is linked to aggravation of asthma, and is likely to be one of many causes of asthma development; long-term exposures to higher concentrations of ozone may also be linked to permanent lung damage, such as abnormal lung development in children (EPA 2019a). Inhalation of ozone causes inflammation and irritation of the tissues lining human airways, causing and worsening a variety of symptoms, and exposure to ozone can reduce the volume of air that the lungs breathe in and cause shortness of breath (ARB 2019).

The people most at risk from breathing air containing ozone include people with asthma, children, older adults, and people who are active outdoors, especially outdoor workers (EPA 2019a). Children are at greatest risk from exposure to ozone because their lungs are still developing and they are more likely to be active outdoors when ozone levels are high, which increases their exposure (EPA 2019a). Studies show that children are no more or less likely to suffer harmful effects than adults; however, children and teens may be more susceptible to ozone and other pollutants because they spend nearly twice as much time outdoors and are engaged in more vigorous activities than adults (ARB 2019). Children breathe more rapidly than adults and inhale more pollution per pound of their body weight than adults and are less likely than adults to notice their own symptoms and avoid harmful exposures. Further research may be able to better distinguish between health effects in children and adults (ARB 2019).

### *Nitrogen Oxides*

Nitrogen dioxide ($NO_2$) is an air quality pollutant of concern because it acts as a respiratory irritant. $NO_2$ is a major component of the group of gaseous nitrogen compounds commonly referred to as $NO_X$. A precursor to ozone formation, $NO_X$ is produced by fuel combustion in motor vehicles, industrial stationary sources (such as refineries, power plants, and chemical manufacturing facilities), ships, aircraft, and rail transit. Typically, $NO_X$ emitted from fuel combustion is in the form of nitric oxide (NO) and $NO_2$, with the vast majority (95 percent) of the $NO_X$ emissions being composed of NO. NO is converted to $NO_2$ in the atmosphere when it reacts with ozone or undergoes photochemical reactions. Short-term exposures to $NO_2$ can potentially aggravate respiratory diseases, particularly asthma, leading to respiratory symptoms (such as coughing, wheezing, or difficulty breathing), hospital admissions, and visits to emergency rooms; longer exposures to elevated concentrations of $NO_2$ may contribute to the development of asthma and potentially increase susceptibility to respiratory infections (EPA 2019b).

### *Carbon Monoxide*

Carbon monoxide (CO) is a nonreactive pollutant that is a product of incomplete combustion; it is mostly associated with emissions from motor vehicle traffic. High CO concentrations develop primarily during winter when periods of light winds combine with the formation of ground-level temperature inversions (typically from the evening through early morning). These conditions result in reduced dispersion of vehicle emissions. Motor vehicles also exhibit increased CO emission rates at low air temperatures. When inhaled at high concentrations, CO combines with hemoglobin in the blood and reduces the oxygen-carrying capacity of the blood. This results in reduced levels of oxygen reaching the brain, heart, and other body tissues. This condition is especially critical for people with cardiovascular diseases, chronic lung disease, or anemia.

### *Particulate Matter*

Particulate matter 10 microns or less in diameter ($PM_{10}$) and particulate matter 2.5 microns or less in diameter ($PM_{2.5}$) represent fractions of particulate matter that can be inhaled into air passages and the lungs, and can cause adverse health effects. Particulate matter in the atmosphere results from many kinds of dust- and fume-producing industrial and agricultural operations, fuel combustion, and atmospheric photochemical reactions. Some sources of particulate matter, such as demolition and construction activities, are more local in nature, while others, such as vehicular traffic, have a more regional effect. Very small particles of certain substances (e.g., sulfates and nitrates) can cause lung damage directly, or can contain adsorbed gases (e.g., chlorides or ammonium) that may be injurious to health. According to a study prepared by the California Air Resources Board (ARB), exposure to ambient $PM_{2.5}$, particularly diesel particulate matter (DPM), can be associated with approximately 14,000 to 24,000 premature annual deaths per year statewide (ARB 2010). Particulate matter also can damage materials and reduce visibility.

## Toxic Air Contaminants

TACs are airborne substances that are capable of causing short-term (acute) and/or long-term (chronic or carcinogenic, i.e., cancer-causing) adverse human health effects (injury or illness). TACs include both organic and inorganic chemical substances. They may be emitted from a variety of common sources including gasoline stations, automobiles, dry cleaners, industrial operations, and painting operations. The current California list of TACs includes approximately 200 compounds, including DPM emissions from diesel-fueled engines (ARB 2011).

# 3.3.2 Environmental Setting

## Regional Topography, Meteorology, and Climate

The Project site is located within the San Francisco Bay Area Air Basin (SFBAAB). Air quality in the basin is influenced by such natural factors as topography, meteorology, and climate, in addition to the presence of existing air pollution sources and ambient conditions. The air basin's Mediterranean climate steers storm tracks away from the region from May through October (i.e., the dry season). Storms more often affect the region during the wet season from November through April. Marin County's proximity to the Pacific Ocean and exposure to onshore breezes provides generally very good air quality in the county and at the Project site.

Annual temperatures in Marin County average in the mid-50s (degrees Fahrenheit), ranging from the low 40s on winter mornings to the mid-70s during summer afternoons. Daily and seasonal oscillations of temperature are small because of the moderating effects of the nearby San Francisco Bay and the Pacific Ocean. In contrast with the steady temperature regime, rainfall is highly variable and confined almost exclusively to November through April. Precipitation varies widely from year to year, as shifts in the annual storm track of a few hundred miles can mean the difference between a very wet year and drought conditions.

Atmospheric conditions such as wind speed and direction, and variable air temperatures interact with the physical features of the landscape to influence the movement and dispersal of air

pollutants, regionally. In southern Marin County, the distance from the ocean is short and elevations are lower, resulting in higher incidence of more humid maritime air in that area. The complex terrain in central Marin County creates sufficient friction to slow the airflow. The prevailing wind directions throughout Marin County are generally from the northwest. Air pollution potential is highest in eastern Marin County, where most of the population is located in semi-sheltered valleys. In the southeast, the influence of marine air keeps pollution levels low (BAAQMD 2017a).

## Existing Air Quality

As required by the 1970 federal Clean Air Act, and discussed above, EPA initially identified six air pollutants (i.e., criteria air pollutants or CAPs]) that are pervasive in urban environments and for which state and federal health-based ambient air quality standards have been established. EPA has regulated the CAPs by developing specific public health and welfare–based criteria as the basis for setting permissible levels. Ozone, carbon monoxide (CO), particulate matter (PM), nitrogen dioxide ($NO_2$), sulfur dioxide ($SO_2$), and lead are the CAPs originally identified by EPA. Since that time, subsets of PM have been also identified for which permissible levels have been established. These include $PM_{10}$ and $PM_{2.5}$, which respectively measure 10 microns or less and 2.5 microns or less in diameter.

BAAQMD is the regional agency with jurisdiction for regulating air quality within the nine-county SFBAAB. The region's air quality monitoring network provides information on ambient concentrations of CAPs at various locations in the San Francisco Bay Area. **Table 3.3-1** presents a five-year summary for the period 2015 to 2019 of the highest annual CAP concentrations, collected at the air quality monitoring station operated and maintained by BAAQMD at 534 4th Street in San Rafael, approximately 1 mile west of the Project site. Table 3.3-1 also compares measured pollutant concentrations with the most stringent applicable ambient air quality standards (state or federal). Concentrations shown in **boldface** indicate an exceedance of the standard.

Table 3.3-1 shows that, according to published data, the most stringent applicable standards for ozone (state one-hour standard of 0.09 parts per million [ppm] and the federal eight-hour standard of 0.07 ppm) were not exceeded in Marin County from 2015 through 2018; however, both the one-hour and eight-hour standards were exceeded once in 2019 (BAAQMD 2021).

As presented in Table 3.3-1, the state 24-hour $PM_{10}$ standard was exceeded on four monitored occasions from 2015 through 2019 in San Rafael, two in 2017 and two in 2018. Because $PM_{10}$ data are monitored every 12 days by BAAQMD, it may be conservatively estimated that the state 24-hour $PM_{10}$ standard was exceeded on up to 48 days per year from 2014 through 2018: 24 days in 2017 and 24 days in 2018 (BAAQMD 2021).

The state 24-hour $PM_{2.5}$ standard was exceeded on 23 days from 2015 through 2019 in San Rafael: two in 2015, eight in 2017, and 13 in 2018. Many of these exceedances of the 24-hour $PM_{2.5}$ standard can be attributed to the October 2017 and November and December 2018 wildfires in Northern California. There were no exceedances of the state 24-hour $PM_{2.5}$ standard in either 2016 or 2019. The state annual-average standards for $PM_{10}$ and $PM_{2.5}$ were not exceeded from 2015 through 2019 (BAAQMD 2021).

**TABLE 3.3-1**
**SUMMARY OF MARIN COUNTY AIR QUALITY MONITORING DATA (2015–2019)**

| Pollutant | Most Stringent Applicable Standard | Number of Days Standards Were Exceeded and Maximum Concentrations Measured[a] | | | | |
|---|---|---|---|---|---|---|
| | | 2015 | 2016 | 2017 | 2018 | 2019 |
| **Ozone** | | | | | | |
| - Days 1-Hour Standard Exceeded | | 0 | 0 | 0 | 0 | **1** |
| - Maximum 1-Hour Concentration (ppm) | >0.09 ppm[b] | 0.08 | 0.08 | 0.09 | 0.07 | 0.09 |
| - Days 8-Hour Standard Exceeded | | 0 | 0 | 0 | 0 | **1** |
| - Maximum 8-Hour Concentration (ppm) | >0.07 ppm[c] | 0.07 | 0.07 | 0.06 | 0.05 | 0.08 |
| **Carbon Monoxide** | | | | | | |
| - Days 1-Hour Standard Exceeded | | 0 | 0 | 0 | 0 | 0 |
| - Maximum 1-Hour Concentration (ppm) | >20 ppm[b] | 1.4 | 1.4 | 2.6 | 2.0 | 1.4 |
| - Days 8-Hour Standard Exceeded | | 0 | 0 | 0 | 0 | 0 |
| - Maximum 8-Hour Concentration (ppm) | >9 ppm[b] | 0.9 | 1.0 | 1.6 | 1.6 | 0.9 |
| **Suspended Particulates ($PM_{10}$)** | | | | | | |
| - Days 24-Hour Standard Exceeded[d] | | 0 | 0 | **2** | **2** | 0 |
| - Maximum 24-Hour Concentration ($\mu g/m^3$) | >50 $\mu g/m^3$ [b] | 42 | 27 | **94** | **166** | 33 |
| - Annual Average ($\mu g/m^3$) | >20 $\mu g/m^3$ [b] | 16 | 14 | 18 | 19 | 14 |
| **Suspended Particulates ($PM_{2.5}$)** | | | | | | |
| - Days 24-Hour Standard Exceeded | | **2** | 0 | **8** | **13** | 0 |
| - Maximum 24-Hour Concentration ($\mu g/m^3$) | >35 $\mu g/m^3$ | **36** | 16 | **75** | **168** | 20 |
| - Annual Average ($\mu g/m^3$) | >12 $\mu g/m^3$ [b, c] | 10 | 8.6 | 9.7 | 11 | 6.4 |
| **Nitrogen Dioxide** | | | | | | |
| - Days 1-Hour Standard Exceeded | | 0 | 0 | 0 | 0 | 0 |
| - Maximum 1-Hour Concentration (ppm) | >0.1 ppm[c] | 0.04 | 0.05 | 0.05 | 0.06 | 0.05 |

NOTES:

**Bold** values are in excess of applicable standard.

$\mu g/m^3$ = micrograms per cubic meter; ND = No data or insufficient data; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; $PM_{10}$ = particulate matter 10 microns or less in diameter; ppm = parts per million.

a. Number of days exceeded is for all days in a given year, except for $PM_{10}$. $PM_{10}$ has been monitored every 12 days effective January 2013.
b. State standard, not to be exceeded.
c. Federal standard, not to be exceeded.
d. Particulate matter $PM_{10}$ is based on a sampling schedule of one out of every six days, for a total of approximately 60 samples per year.

SOURCE: BAAQMD 2021.

There were no exceedances of the CO or $NO_2$ standards during the five-year study period.

## Toxic Air Contaminants and Local Health Risks and Hazards

In addition to CAPs, as discussed above, individual projects emit TACs as well. TACs collectively refer to a diverse group of air pollutants that may cause chronic (i.e., long-duration) and acute (i.e., severe but short-term) adverse effects on human health, including carcinogenic effects. Human health effects of TACs include birth defects, neurological damage, cancer, and death. There are hundreds of different types of TACs with varying degrees of toxicity. Thus, individual TACs vary greatly in the health risk they present; at a given level of exposure, one TAC may pose a hazard that is many times greater than another.

Unlike CAPs, TACs are not subject to ambient air quality standards, but are regulated by BAAQMD using a risk-based approach to determine which sources and which pollutants to control as well as the degree of control. A *health risk assessment* (HRA) is an analysis that estimates human health exposure to toxic substances, and when considered together with information regarding the toxic potency of the substances, an HRA provides quantitative estimates of health risks.[1]

Exposures to fine PM ($PM_{2.5}$) are strongly associated with mortality, respiratory diseases, and poor lung development in children, and other health effects, such as hospitalization for cardiopulmonary disease. As described below, diesel particulate matter (DPM), a byproduct of diesel fuel combustion, is also of concern.

### *Diesel Particulate Matter*

ARB identified DPM as a TAC in 1998, based primarily on evidence demonstrating cancer effects in humans (ARB 1998). The estimated cancer risk from exposure to diesel exhaust is much higher than the risk associated with any other TAC routinely measured in the region. The exhaust from diesel engines includes hundreds of different gaseous and particulate components, many of which are toxic. Mobile sources such as trucks and buses are among the primary sources of diesel emissions, and concentrations of DPM are higher near heavily traveled highways.

ARB estimated that as of 2000, the average Bay Area cancer risk from exposure to DPM, based on a population-weighted average ambient DPM concentration, is approximately 480 in one million, which is much higher than the risk associated with any other toxic air pollutant routinely measured in the region. The statewide risk from DPM, as determined by ARB, declined from 750 in one million in 1990 to 570 in one million in 1995; by 2012, ARB estimated the average statewide cancer risk from DPM to be 520 in one million (ARB 2009). This calculated cancer risk value from ambient air exposure in California can be compared against the lifetime probability of being diagnosed with cancer in the United States, from all causes, which for men is more than 40 percent (based on a sampling of 17 regions nationwide), or greater than 400,000 in one million, according to the American Cancer Society (2020).

[1] In general, a health risk assessment is required if BAAQMD concludes that projected emissions of a specific air toxic compound from a proposed new or modified source suggest a potential public health risk. The applicant is then subject to a health risk assessment for the source in question. Such an assessment generally evaluates chronic, long-term effects, estimating the increased risk of cancer as a result of exposure to one or more TACs.

In 2000, ARB approved a comprehensive Diesel Risk Reduction Plan to reduce diesel emissions from both new and existing diesel-fueled vehicles and engines. Subsequent board regulations apply to new trucks and diesel fuel. The regulation is intended to result in an 80 percent decrease in statewide diesel health risk in 2020 as compared with the diesel risk in 2000.

Despite notable emission reductions, ARB recommends that proximity to sources of DPM emissions be considered in the siting of new sensitive land uses. ARB notes that these recommendations are advisory and should not be interpreted as defined "buffer zones," and that local agencies must balance other considerations, including transportation needs, the benefits of urban infill, community economic development priorities, and other quality of life issues. With careful evaluation of exposure, health risks, and affirmative steps to reduce risk where necessary, ARB's position is that infill development, mixed-use, higher density, transit-oriented development, and other concepts that benefit regional air quality can be compatible with protecting the health of individuals at the neighborhood level (ARB 2005).

Studies have demonstrated that DPM from diesel-fueled engines is a human carcinogen and that chronic (long-term) inhalation exposure to DPM poses a chronic health risk. Health effects from carcinogenic air toxics are usually described in terms of individual cancer risk. Individual cancer risk is the likelihood that a person exposed to air toxic concentrations over a 30-year period will contract cancer, based on the use of standard risk-assessment methodology. The maximally exposed individual represents the worst-case risk estimate, based on a theoretical person continuously exposed for a lifetime at the point of highest DPM concentration in the air. This is a highly conservative assumption, because most people do not remain at home all day and residents change residences an average of every 11–12 years. In addition, this methodology assumes that residents are experiencing outdoor concentrations for the entire exposure period.

### *Soil Contamination and Naturally Occurring Asbestos*

Marin County is among the identified counties where ultramafic bedrock materials are present. These bedrock materials contain naturally occurring asbestos particles or fibers, which could be disturbed during excavation activities. However, no serpentine soils are present on the Project site, which indicates that the Project site is not underlain by materials that contain naturally occurring asbestos.

## Sensitive Receptors

Air quality does not affect every individual in the population in the same way, and some groups are more sensitive to adverse health effects than others. Population subgroups sensitive to the health effects of air pollutants include the elderly and the young; population subgroups with higher rates of respiratory disease, such as asthma and chronic obstructive pulmonary disease; and populations with other environmental or occupational health exposures (e.g., indoor air quality) that affect cardiovascular or respiratory diseases. BAAQMD defines *sensitive receptors* as children, adults, and seniors occupying or residing in residential dwellings, schools, day care centers, hospitals, and senior-care facilities (BAAQMD 2017a). Workers are not considered sensitive receptors because all employers must follow regulations set forth by the U.S. Occupational Safety and Health Administration to ensure the health and well-being of their employees.

The proximity of sensitive receptors to motor vehicles is an air pollution concern, especially in densely developed urban areas where building setbacks are limited and roadway volumes are higher than most other parts of the Bay Area. Vehicles also contribute to particulates by generating road dust and through tire wear.

The Project site is within a primarily residential neighborhood that includes schools and day care centers, with the sensitive residential and school/daycare receptors located nearest the site described as follows. Figure 2-3 in Chapter 2 shows that existing residences on the south side of Spinnaker Point Drive are as close as 150 feet from proposed raised levee and ecotone construction. Additionally, existing residences along the terminus of Sorrento Way would be adjacent to proposed staging areas and approximately 200 feet from the proposed new levee for the diked marsh. The Project site is adjacent to the Pickleweed Children's Center, a preschool. Bahia Vista Elementary School is located approximately 300 feet south of the Project site.

## Baseline Conditions

### *Existing Sources of Air Pollutant Emissions*

Existing sources of CAP emissions at the Project site consist mainly of vehicles traveling on roadways south of the Project site. There is one existing stationary source of TACs within 1,000 feet of the Project site. The City of San Rafael Department of Public Works operates a standby diesel generator at its property located at 3780 Kerner Boulevard, approximately 200 feet south of Canal Street.

### *Existing Sources of Odors*

The BAAQMD CEQA Guidelines identify land uses that have the potential to generate continuous odors and odor complaints during operation. These include wastewater treatment plants, landfills, confined-animal facilities, composting stations, food manufacturing plants, refineries, and chemical plants (BAAQMD 2017a). There are no substantial odor-generating facilities within 1,000 feet of the project site.

# 3.3.3 Regulatory Setting

## Federal Regulations

The 1970 Clean Air Act (last amended in 1990) requires that regional planning and air pollution control agencies prepare a regional air quality plan to outline the measures by which both stationary and mobile sources of pollutants will be controlled to achieve all ambient air quality standards by the deadlines specified in the act. These ambient air quality standards are intended to protect the public health and welfare, and they specify the concentration of pollutants (with an adequate margin of safety) to which the public can be exposed without adverse health effects. They are designed to protect those segments of the public most susceptible to respiratory distress, which include asthmatics, the very young, the elderly, people weak from other illness or disease, or persons engaged in strenuous work or exercise. Healthy adults can tolerate occasional exposure to air pollution levels that are somewhat above ambient air quality standards before adverse health effects are observed.

**Table 3.3-2** summarizes current California ambient air quality standards (CAAQS) and national ambient air quality standards (NAAQS) and the SFBAAB's attainment status. In general, the SFBAAB experiences low concentrations of most pollutants when compared to federal standards, except for ozone and particulate matter ($PM_{10}$ and $PM_{2.5}$), for which standards are exceeded periodically (see Table 3.3-1).

**TABLE 3.3-2**
**STATE AND FEDERAL AMBIENT AIR QUALITY STANDARDS AND ATTAINMENT STATUS FOR THE SAN FRANCISCO BAY AREA AIR BASIN**

| Pollutant | Averaging Time | State (CAAQS[a]) | | Federal (NAAQS[b]) | |
|---|---|---|---|---|---|
| | | Standard | Attainment Status | Standard | Attainment Status |
| Ozone | 1-hour | 0.09 ppm | **N** | NA | See Note c |
| | 8-hour | 0.070 ppm | **N** | 0.070 ppm[d] | **N**/Marginal |
| Carbon monoxide (CO) | 1-hour | 20 ppm | A | 35 ppm | A |
| | 8-hour | 9 ppm | A | 9 ppm | A |
| Nitrogen dioxide ($NO_2$) | 1-hour | 0.18 ppm | A | 0.100 ppm | U |
| | Annual | 0.030 ppm | NA | 0.053 ppm | A |
| Sulfur dioxide ($SO_2$) | 1-hour | 0.25 ppm | A | 0.075 ppm | A |
| | 24-hour | 0.04 ppm | A | 0.14 ppm | A |
| | Annual | NA | NA | 0.03 ppm | A |
| Particulate matter ($PM_{10}$) | 24-hour | 50 µg/m$^3$ | **N** | 150 µg/m$^3$ | U |
| | Annual[e] | 20 µg/m$^3$ [f] | **N** | NA | NA |
| Fine particulate matter ($PM_{2.5}$) | 24-hour | NA | NA | 35 µg/m$^3$ | **N** |
| | Annual | 12 µg/m$^3$ | **N** | 12 µg/m$^3$ | U/A |
| Sulfates | 24-hour | 25 µg/m$^3$ | A | NA | NA |
| Lead | 30-day | 1.5 µg/m$^3$ | A | NA | NA |
| | Cal. Quarter | NA | NA | 1.5 µg/m$^3$ | A |
| | Rolling 3-month average | NA | NA | 0.15 | U |
| Hydrogen sulfide | 1-hour | 0.03 ppm | U | NA | NA |
| Visibility-reducing particles | 8-hour | See Note g | U | NA | NA |

NOTES:

A = Attainment; **N** = Nonattainment; U = Unclassified; NA = Not Applicable, no applicable standard

µg/m$^3$ = micrograms per cubic meter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; $PM_{10}$ = particulate matter 10 microns or less in diameter; ppm = parts per million

a. CAAQS = California ambient air quality standards. CAAQS for ozone, CO (except Lake Tahoe), $SO_2$ (1-hour and 24-hour), $NO_2$, PM, and visibility-reducing particles are values that are not to be exceeded. All other state standards shown are values not to be equaled or exceeded.
b. NAAQS = national ambient air quality standards. NAAQS, other than ozone and particulates, and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The 8-hour ozone standard is attained when the 3-year average of the fourth highest daily concentration is 0.08 ppm or less. The 24-hour $PM_{10}$ standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than the standard. The 24-hour $PM_{2.5}$ standard is attained when the 3-year average of the 98th percentile is less than the standard.
c. The U.S. Environmental Protection Agency revoked the national 1-hour ozone standard on June 15, 2005.
d. This federal 8-hour ozone standard was approved by the U.S. Environmental Protection Agency in October 2015 and became effective on December 28, 2015.
e. State standard = annual geometric mean; national standard = annual arithmetic mean.
f. In June 2002, the California Air Resources Board established new annual standards for $PM_{2.5}$ and $PM_{10}$.
g. Statewide visibility-reducing particle standard (except Lake Tahoe Air Basin): Particles in sufficient amount to produce an extinction coefficient of 0.23 per kilometer when the relative humidity is less than 70 percent. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range.

SOURCES: BAAQMD 2017b; EPA 2021.

In June 2004, the Bay Area was designated as a marginal nonattainment area of the national eight-hour ozone standard.[2] EPA lowered the national eight-hour ozone standard from 0.80 to 0.75 ppm effective May 27, 2008. In October 2015, EPA designated the Bay Area as a marginal nonattainment region for the 0.70 ppm ozone standard established in 2015. The SFBAAB is in attainment for other criteria pollutants, with the exception of the 24-hour standards for $PM_{2.5}$, for which the Bay Area is designated as "Unclassified." "Unclassified" is defined by the Clean Air Act as any area that cannot be classified, on the basis of available information, as meeting or not meeting the primary or secondary NAAQS for the pollutant.

On January 9, 2013, EPA issued a final rule to determine that the Bay Area attains the 24-hour $PM_{2.5}$ national standard. This EPA rule suspends key State Implementation Plan requirements as long as monitoring data continue to show that the Bay Area attains the standard. Despite this EPA action, the Bay Area will continue to be designated as "nonattainment" for the national 24-hour $PM_{2.5}$ standard until BAAQMD submits a "redesignation request" and a "maintenance plan" to EPA, and EPA approves the proposed redesignation.

## State Regulations

Although the federal Clean Air Act established NAAQS, individual states retained the option to adopt more stringent standards and to include other pollution sources. California had already established its own air quality standards when federal standards were established; because of the unique meteorological conditions in California, there are considerable differences between the CAAQS and the NAAQS, as shown in Table 3.3-2. The California ambient standards tend to be at least as protective as the national ambient standards and are often more stringent.

In 1988, the California Legislature enacted the California Clean Air Act (California Health and Safety Code Sections 39600 et seq.). Like its federal counterpart, the California Clean Air Act called for the designation of areas as attainment or nonattainment, but based on state ambient air quality standards rather than the federal standards. As indicated in Table 3.3-2, the SFBAAB is designated as "nonattainment" under the state standards for ozone (both one-hour and eight-hour), $PM_{10}$, and $PM_{2.5}$. The SFBAAB is designated as "attainment" for other pollutants.

### *Off-Road Emissions Regulation for Compression-Ignition Engines and Equipment*

Engines designated as non-road engines by EPA are known as off-road engines in California state regulations implemented by ARB. Similar to the EPA Non-road Diesel Rule, the Off-Road Emissions Regulation for New Compression-Ignition Engines and Equipment applies to diesel engines such as those found in construction, general industrial, and terminal equipment. Initially adopted in 2000 and amended in 2004, the regulation establishes Tier emissions standards, test procedures, and warranty and certification requirements. For some model years and engine sizes, the ARB Tier emission standards are more stringent than the EPA standards.

[2] "Marginal nonattainment area" means an area designated marginal nonattainment for the one-hour national ambient air quality standard for ozone.

### *California Air Resources Board In-Use Off-Road Diesel Vehicle Regulation*

ARB adopted the In-Use Off-Road Diesel Vehicle Regulation in July 2007 and amended the regulation in December 2011. This regulation requires owners of off-road mobile equipment powered by diesel engines 25 horsepower or larger to meet the fleet-average or best available control technology (BACT) requirements for $NO_X$ and PM emissions by January 1 of each year. The regulation also establishes idling restrictions, limitations on buying and selling older off-road diesel vehicles (Tier 0), reporting requirements, and retrofit and replacement requirements. The requirements and compliance dates vary by fleet size; performance requirements began for large fleets in 2014, for medium fleets in 2017, and for small fleets in 2019. Requirements regarding idling, disclosure, reporting, and labeling took effect in 2008 and 2009. The Diesel Off-Road On-line Reporting System is an online tool designed to help fleet owners report their off-road diesel vehicle inventories and actions taken to reduce vehicle emissions to ARB, as required by the In-Use Off-Road Diesel Vehicle Regulation.

## Regional Regulations

### *Bay Area Air Quality Management District*

BAAQMD is the regional agency with jurisdiction over the nine-county region located within the SFBAAB. The Association of Bay Area Governments, Metropolitan Transportation Commission, county transportation agencies, cities and counties, and various nongovernmental organizations also participate in the effort to improve air quality through a variety of programs. These programs include the adoption of regulations and policies, as well as implementation of extensive education and public outreach programs. BAAQMD is responsible for attaining and maintaining air quality in the region within the NAAQS and CAAQS. Specifically, BAAQMD monitors ambient air pollutant levels throughout the region and develops and implements strategies to attain the applicable federal and state standards.

BAAQMD currently does not have authority to regulate emissions from motor vehicles, as that is done at the state level. Specific rules and regulations adopted by BAAQMD limit the emissions that can be generated by various stationary sources, and identify specific pollution reduction measures that must be implemented in association with various activities. These rules regulate not only emissions of the six CAPs, but also TAC emissions sources. Stationary sources are regulated through BAAQMD's permitting process and standards of operation. Through this permitting process, including an annual permit review, BAAQMD monitors the generation of stationary emissions and uses this information in developing its air quality plans. Any sources of stationary emissions constructed as part of the Proposed Project would be subject to the BAAQMD Rules and Regulations. Both federal and state ozone plans rely heavily upon stationary source control measures set forth in BAAQMD's Rules and Regulations.

BAAQMD has also identified a series of BMPs for the control of fugitive dust generated during construction activities. These measures, which focus on reducing dust generated by excavation, material movement, and movement of off-road equipment on unpaved surfaces, are considered sufficient to reduce dust-related impacts to a less-than-significant level (BAAQMD 2017a).

### Bay Area Air Quality Planning Relative to State and Federal Standards

For state air quality planning purposes, the SFBAAB is classified as a serious nonattainment area for the one-hour ozone standard. The "serious" classification triggers various plan submittal requirements and transportation performance standards. One such requirement is that BAAQMD update the Clean Air Plan every three years to reflect progress in meeting the air quality standards and to incorporate new information regarding the feasibility of control measures and new emission inventory data (Sections 40924 and 40925 of the California Health and Safety Code). The Bay Area's record of progress in implementing previous measures must also be reviewed. The plans for the air basin are prepared with the cooperation of the Metropolitan Transportation Commission and Association of Bay Area Governments.

In April 2017, BAAQMD adopted the 2017 Clean Air Plan, whose primary goals are to protect public health and to protect the climate (BAAQMD 2017c). The plan includes a wide range of proposed control measures to reduce combustion-related activities, decrease fossil fuel combustion, improve energy efficiency, and decrease emissions of potent GHGs. The 2017 Clean Air Plan updates the Bay Area 2010 Clean Air Plan and complies with state air quality planning requirements, as codified in the California Health and Safety Code (although the 2017 plan was delayed beyond the code's three-year update requirement). The SFBAAB is designated as nonattainment for both the one- and eight-hour state ozone standards. In addition, emissions of ozone precursors in the air basin contribute to air quality problems in neighboring air basins. Under these circumstances, state law requires the Clean Air Plan to include all feasible measures to reduce emissions of ozone precursors and to reduce the transport of ozone precursors to neighboring air basins.

The 2017 Clean Air Plan contains 85 measures to address reduction of several pollutants: ozone precursors, particulate matter, air toxics, and GHGs. Other measures focus on a single type of pollutant, potent GHGs such as methane and black carbon that consists of harmful fine particles that affect public health. These control strategies are grouped into the following categories:

- Stationary Source Measures
- Transportation Control Measures
- Energy Control Measures
- Building Control Measures
- Agricultural Control Measures
- Natural and Working Lands Control Measures
- Waste Management Control Measures
- Water Control Measures
- Super GHG Control Measures

Under the California Clean Air Act, BAAQMD is required to develop an air quality attainment plan for criteria pollutants that are designated as nonattainment within the air basin. Several components of the Proposed Project may be subject to BAAQMD rules and regulations

governing criteria pollutants, TACs, and odorous compounds, even though permits may not be required.

## Local Plans and Policies

### *The City of San Rafael 2040 General Plan*

The Conservation and Climate Change Element of the General Plan 2040 includes the following policies and program related to air quality and the Proposed Project (City of San Rafael 2021):

> **Goal C-2:** Clean Air Reduce air pollution to improve environmental quality and protect public health.
>
> > ***Policy C-2.4*:** Particulate Matter Pollution Reduction Promote the reduction of particulate matter from roads, parking lots, construction sites, agricultural lands, wildfires, and other sources.
> >
> > > *Program C-2.4A: Particulate Matter Exposure.* Through development review, require that Best Available Control Technology (BACT) measures (such as setbacks, landscaping, paving, soil and dust management, and parking lot street sweeping) are used to protect sensitive receptors from particulate matter. This should include control of construction-related dust and truck emissions as well as long-term impacts associated with project operations. Where appropriate, health risk assessments may be required to evaluate risks and determine appropriate mitigation measures.

# 3.3.4 Impacts and Mitigation Measures

## Significance Criteria

The criteria used to determine the significance of impacts related to air quality are based on Appendix G of the CEQA Guidelines. The Proposed Project would have a significant impact if it would:

- Conflict with or obstruct implementation of the applicable air quality plan.
- Result in a cumulatively considerable net increase of any criteria pollutant for which the region is in nonattainment under an applicable federal or state ambient air quality standard.
- Expose sensitive receptors to substantial pollutant concentrations.
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

The analysis presented in this technical section uses the methodologies provided in the BAAQMD CEQA Guidelines, as updated in 2017 (BAAQMD 2017c). The City of San Rafael, as lead agency, has determined that Appendix D of the BAAQMD CEQA Guidelines, combined with BAAQMD's Revised Draft Options and Justification Report, provide substantial evidence to support the applicable thresholds. Therefore, the City has determined that they are appropriate for use in this analysis. The methods and specific thresholds used to judge the significance of the Proposed Project's air quality impacts are identified below.

# Methodology

## *Air Quality Plans*

BAAQMD recommends that the lead agency approving a project that requires an air quality plan consistency determination analyze the project with respect to the following questions:

(1) Does the project support the primary goals of the 2017 Clean Air Plan?

(2) Does the project include applicable control measures from the 2017 Clean Air Plan?

(3) Does the project disrupt or hinder implementation of any 2017 Clean Air Plan control measures?

If the answers to the first two questions are "yes" and the third question is answered "no," BAAQMD considers the project consistent with the 2017 Clean Air Plan.

Any project that would not support the goals of the 2017 Clean Air Plan would not be considered consistent with the plan. The recommended measure for determining the Proposed Project's support of these goals is identifying consistency with the CEQA thresholds of significance. If the CEQA thresholds of significance are exceeded, then the Project would not be considered to support the 2017 Clean Air Plan's goals, and the associated impact would be significant.

## *Criteria Pollutants*

The analysis of CAP emissions considers the impacts related to emissions of nonattainment pollutants and their precursors. Project-related construction equipment would not directly emit ozone. However, the ozone precursors ROG and $NO_x$ would be emitted; therefore, along with particulate matter, ROG and $NO_X$ were the focus of the impact assessment.

Because ozone is formed through a complex photochemical reaction between $NO_x$ and ROG in the atmosphere with the presence of sunlight, the impacts of ozone are typically considered on a basinwide or regional basis instead of a localized basis. The ambient air quality standards for ozone are concentration-based; they are not based on the contributions of their precursor pollutants (i.e., $NO_X$ and ROG). It is not necessarily the mass of precursor pollutants that causes human health effects, as opposed to the concentration of the resulting ozone or particulate matter. Ozone formation is complex and a nonlinear relationship exists between a concentration of ozone and its precursor gases. For this reason, and given the state of environmental science modeling at this time, it is infeasible to convert specific emissions levels of $NO_X$ or ROG emitted in a particular area to a particular ozone concentration in that area. Meteorology, the presence of sunlight, seasonal impacts, and other complex chemical factors all combine to determine the ultimate concentration and location of ozone (SCAQMD 2014; SJVAPCD 2014).

To determine the Proposed Project's impacts related to a contribution to an existing or projected air quality violation, and to potential to result in a cumulatively considerable net increase of any CAP or associated precursors, the Project's estimated direct and indirect exhaust emissions were compared to the significance thresholds. For short-term construction emissions, the significance thresholds are 54 pounds per day for ROG, $NO_X$, and $PM_{2.5}$ and 82 pounds per day for $PM_{10}$.

Only the exhaust portions of $PM_{2.5}$ and $PM_{10}$ emissions were compared to the construction thresholds.

BAAQMD considers implementation of its recommended mitigation measures for fugitive dust sufficient to reduce impacts of construction-related fugitive dust to a less-than-significant level. Therefore, BAAQMD recommends that analyses focus on implementing dust control measures rather than comparing estimated levels of fugitive dust to a quantitative significance threshold.

### *Community Health Risk*

Impacts of the Proposed Project related to exposure of sensitive receptors or the general public to substantial pollutant concentrations were evaluated by assessing the health risks posed by the placement of new sources of TAC emissions near existing sensitive receptors. Specifically, according to BAAQMD, the Project would have a significant air quality impact if the construction phase would expose persons to substantial levels of TACs, such that the probability of contracting cancer would exceed 10 in one million, or if it would expose persons to pollutants such that a chronic Hazard Index of 1.0 would be exceeded. The Project would not include any new sources of TAC emissions and would have no operational health risk impacts. The Project's only source of TAC emissions would be DPM exhaust emitted by off-road equipment and heavy-duty trucks during construction.

In addition, a significant impact would occur if construction of the Proposed Project would result in an incremental increase in annual-average ambient concentrations of $PM_{2.5}$ of more than 0.3 microgram per cubic meter ($\mu g/m^3$). The Project would have a significant cumulative health risk impact if the combined cancer risk associated with all local permitted stationary sources and major roadways plus the risks associated with the Project at the maximally exposed individual would exceed 100 in one million, would result in a non-cancer Hazard Index exceeding 10, or would result in an incremental increase in annual-average $PM_{2.5}$ concentrations exceeding 0.8 $\mu g/m^3$ (BAAQMD 2017c).

### *Odors*

Impacts of the Proposed Project related to the creation or exposure of a substantial number of people to objectionable odors were evaluated based on the potential for the Project to generate odors that could affect nearby sensitive receptors.

## Approach to Analysis

The Proposed Project's construction-related emissions were quantified using the methods described below for comparison to the BAAQMD project-level thresholds discussed previously.

### *Construction Emissions*

Exhaust emissions of CAPs during on-site and off-site Project construction activities were estimated using the latest available version of California Emissions Estimator Model (CalEEMod) version 2020.4.0. CalEEMod was developed by the South Coast Air Quality Management District and other California air districts to assist lead agencies in determining projects' air quality impacts. The

model, which combines the databases from ARB's EMFAC and OFFROAD models into a single tool, captured most of the Project's emissions-producing activities associated with construction equipment, worker vehicles, and heavy-duty trucks. A standalone spreadsheet with marine vessel calculations and ARB CAP emission factors was used to derive emissions from operations of a tugboat to maneuver a barge for equipment and materials in San Rafael Bay.

Project assumptions for the air quality analysis were developed based the description of Project construction and phasing, as discussed in Section 2.3, Project Construction. These assumptions included a conservative construction scenario with maximum concurrent activities, which would result in an limited construction schedule (generally September through January) over three consecutive years. The information used for the analysis consisted of a customized phased schedule along with a list of required off-road construction equipment, equipment workdays, worker trips, hauling trips, and mileage of trips required to complete the Project. This information was then entered into CalEEMod to estimate the Proposed Project's annual construction-related mass emissions of CAPs. CalEEMod defaults were used for Project components in which there were no Project-specific data, primarily load factors. **Appendix C**, ***Air Quality and Greenhouse Gas Emissions Supporting Documentation***, contains the construction schedule, emissions spreadsheets, and CalEEMod output sheets used to quantify the Project's construction emissions of CAPs.

As stated in Chapter 2, *Project Description*, reusing excavated material as on-site fill to the extent possible would be encouraged, to avoid trucking material off-site. As another alternative to trucking, material for construction of the coarse beach would be transported to the site partly via barge. Refer to Table 2-4 of the Project Description for specific material volumes associated with Project construction. For the shoreline levee improvements, approximately 6,000 cubic yards of material would be excavated, then backfilled with imported, less permeable soils. Approximately 18,000 cubic yards of additional fill material would be imported, from one or more upland sources up to 20 miles away, and placed on-site for levee improvements and ecotone slope construction. Fill material would be trucked to the site on city streets and unloaded at the driveway on the east side of the Albert J. Boro Community Center and Pickleweed Park. For beach construction, beach material (totaling approximately 26,000 cubic yards) would be transported to the site by barge which would generate emissions considered in this analysis.

The Proposed Project would require approximately 25,000 cubic yards of imported material in addition to the 6,000 cubic yards of fill material created from on-site Project activities (i.e., excavation of levee foundation soils). It is possible that one to four local dredging projects could provide suitable fill volume required for the Project. For example, the Larkspur Ferry Channel is dredged by the Golden Gate Bridge, Highway and Transportation District every four to five years. One dredge cycle for the ferry terminal would generate more than enough of the material needed for the Tiscornia Marsh restoration. The dredge materials from these four local projects are currently hauled by barge to either the Montezuma or Open Ocean dredge disposal site. Both disposal sites are farther from the four dredge locations than the Proposed Project site. Thus, transporting dredged material to the Project site via barge would generate reduced air pollutant emissions compared to transporting the material to these more distant locations for disposal under normal conditions. Therefore, this analysis conservatively assumes that no emissions increase

would result from transporting the 25,000 cubic yards of dredge material that would be imported for the Proposed Project.

The Project's construction-period emissions were divided by a conservative estimate of the total number of construction workdays (i.e., 275 workdays) and converted into pounds to derive the average daily construction emissions. Appendix C presents the emissions summary spreadsheet used for these calculations.

### *Health Risk*

A health risk assessment evaluated the risks to nearby receptors from exposure to TACs associated with the Proposed Project (Appendix C). The HRA focused on construction emissions at the Project site, which is considered a new but temporary source. The HRA focused on cancer risks, chronic health hazards, and $PM_{2.5}$ concentrations at residences located near the Project site.

Consistent with the BAAQMD CEQA Guidelines, the following analysis assesses impacts related to health risks and hazards at sensitive receptors in the Project vicinity. Because Project construction would represent a new emissions source, the health risk and hazard impacts are analyzed at the receptor that would be exposed to the maximum risk, hazard, and $PM_{2.5}$ concentrations.

For construction activities, exposure to diesel particulate matter represents the primary health hazard. DPM is a complex mixture of chemicals and particulate matter that has been identified by the State of California as a TAC with potential cancer and chronic non-cancer effects. DPM emissions would be generated during the operation of off-road construction equipment (e.g., excavators, loaders, cranes, graders), on-road heavy-duty vehicles that burn diesel fuel, and marine vessels (e.g., tugboats, barges, crew boats). Although other DPM exposure pathways exist (ingestion, contact with the skin), inhalation is the dominant exposure pathway for both cancer risk and chronic non-cancer health effects. Consequently, the HRA conducted for the Proposed Project evaluated the cancer and chronic non-cancer effects of DPM inhalation only.

Pollutant concentrations were estimated using the American Meteorological Society/ Environmental Protection Agency Regulatory Model Improvement Committee's regulatory air dispersion model (AERMOD version 19191). Each source was modeled with a unitized emissions rate of 1 gram/second (g/s). The modeled concentration at each receptor ([$\mu g/m^3$]/[g/s]) represents a "dispersion factor." The dispersion factor from each source was then multiplied by the source's annual-average emissions rate to determine the annual-average ambient pollutant concentration at every receptor from that source. Each source's resulting pollutant concentrations were added together at each receptor to obtain the final result. For the Proposed Project, three separate sources were included in the dispersion modeling:

- One polygon area source representing the on-site construction equipment in the predominant land-side area of construction activity.
- Two volume sources representing the marine vessels in the predominant water-side area of construction activity.
- One line area source representing heavy-duty truck traffic to and from the Project site.

The above sources represent the worst-case scenario from DPM and $PM_{2.5}$ emissions occurring at the Project's nearest receptor. To identify the maximally exposed individual receptor (MEIR) for the Project, discrete cartesian receptors were placed to simulate the surrounding residences located within 1,000 feet of the Project site. BAAQMD does not require receptors to cover precise locations, but rather, a representative grid of sensitive areas; residential areas modeled were configured with a receptor grid placement of 20 meters by 20 meters. Additionally, receptors were modeled at Bahia Vista Elementary School to confirm the appropriate fraction of time-at-home risk input for the residential receptors' cancer risk equation.[3]

To determine the risk of the Proposed Project to sensitive receptors, unit risk factors from the California Office of Environmental Health Hazard Assessment (OEHHA) guidance were used to convert maximum TAC concentrations to cancer risks and chronic health hazards (OEHHA 2015). The results of the HRA are discussed in the *Impacts and Mitigation Measures* section below. Detailed calculations are presented in Appendix C.

## Impact Summary

**Table 3.3-3** provides a summary of Project impacts on air quality.

**TABLE 3.3-3**
**SUMMARY OF AIR QUALITY IMPACTS**

| Impact Statement | Construction |
|---|---|
| **Impact 3.3-1:** The Project would not conflict with or obstruct implementation of the applicable air quality plan. | LTS |
| **Impact 3.3-2:** The Project could result in a cumulatively considerable net increase of a criteria air pollutant for which the SFBAAB is in nonattainment under applicable federal and state ambient air quality standards. | LTSM |
| **Impact 3.3-3:** The Project could expose sensitive receptors to substantial pollutant concentrations. | LTSM |
| **Impact 3.3-4:** The Project would not result in emissions that lead to odors affecting a substantial number of people. | LTS |
| **Impact 3.3-5:** The Project could result in cumulative emissions of air pollutants. | LTSM |

NOTES:
LTS = Less than significant
LTSM = Less than significant with mitigation

## Impact Analysis

### Impact 3.3-1: The Project would not conflict with or obstruct implementation of the applicable air quality plan. (*Less than Significant*)

#### Construction and Operation Impacts

The most recently adopted air quality plan for the Project area is BAAQMD's 2017 Clean Air Plan. The 2017 Clean Air Plan focuses on two closely related goals: protecting public health and

[3] The recommended values for Fraction of Time at Home when evaluating residential cancer risk are dependent on the estimated cancer risk at the nearest school (OEHHA 2015).

protecting the climate. The 2017 Clean Air Plan is an update to BAAQMD's 2010 Ozone Strategy to comply with state air quality planning requirements and pursue the region's attainment with the NAAQS and CAAQS. The 2017 Clean Air Plan also serves as a multi-pollutant air quality plan to protect public health and the climate. The control strategy of the 2017 Clean Air Plan includes revised, updated, and new measures in the three control measure categories: stationary sources, transportation, and buildings and energy.

2017 Clean Air Plan Transportation Control Measure TR22, Construction, Freight, and Farming Equipment, is the only measure that addresses emissions from a construction project. It provides incentives for the early deployment of electric, Tier 3, and Tier 4 off-road engines used in construction, freight, and farming equipment. This control measure is designated for implementation by BAAQMD to provide incentives and would not be applicable to individual project applicants. Consequently, the Proposed Project would be consistent with the 2017 Clean Air Plan, and this impact would be ***less than significant.***

Notwithstanding the Project's less-than-significant impact with respect to consistency with the 2017 Clean Air Plan, **Mitigation Measure 3.3-2:** ***EPA Tier 4 Engines*** is identified in Impact 3.3-3 to address construction-related health risk impacts, below, which requires the applicant to implement Tier 4 construction equipment. Therefore, the Project would be implementing a measure meeting the intent of Transportation Measure TR22, even though Transportation Measure TR22 is designated for implementation by BAAQMD.

**Mitigation:** None required.

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**Impact 3.3-2: The Project could result in a cumulatively considerable net increase of a criteria air pollutant for which the SFBAAB is in nonattainment under applicable federal and state ambient air quality standards. (*Less than Significant with Mitigation*)**

The BAAQMD thresholds of significance for construction and operation represent the levels at which a project's individual emissions of criteria air pollutants or precursors would result in a cumulatively considerable contribution to the SFBAAB's existing air quality conditions. If daily average construction or operational emissions, or annual operational emissions of CAPs or precursors would exceed these thresholds, a project would result in a cumulatively significant impact.

As presented in the discussions below, the Proposed Project's construction emissions would not exceed the applicable BAAQMD CAP thresholds. In addition, the Project would not generate substantive long-term operational emissions. Therefore, the Project would not result in a cumulatively considerable net increase in any pollutants for which the SFBAAB is in nonattainment under applicable federal or state ambient air quality standards.

### Construction Impacts

Emissions of ROG, $NO_X$, $PM_{10}$, and $PM_{2.5}$ from construction equipment, worker trips, hauling trips, and tugboat and work boat operations associated with the Proposed Project would incrementally add to the regional atmospheric loading of these pollutants during Project

construction. This analysis conservatively assumes that Project construction would occur over a period of approximately 275 workdays, commencing in September 2023 and finishing in December 2025. **Table 3.3-4** presents the tons of emissions per each work phase and the estimated unmitigated average daily construction exhaust emissions that would be associated with the Project for comparison to the BAAQMD significance threshold for construction emissions.

**TABLE 3.3-4**
**TOTAL UNMITIGATED AVERAGE DAILY CONSTRUCTION EMISSIONS**

| | Tons | | | |
|---|---|---|---|---|
| **Parameter** | **ROG** | **$NO_x$** | **Exhaust $PM_{10}$** | **Exhaust $PM_{2.5}$** |
| Phase 1 On-site construction and haul trucks | 0.18 | 1.50 | 0.067 | 0.062 |
| Phase 1 Marine emissions (tugboat and work boat) | 0.17 | 1.97 | 0.11 | 0.10 |
| Phase 2 On-site construction and haul trucks | 0.25 | 2.55 | 0.096 | 0.089 |
| Phase 2 Marine emissions (work boat) | 0.02 | 0.22 | 0.01 | 0.01 |
| Phase 3 On-site construction and haul trucks | 0.055 | 0.43 | 0.019 | 0.017 |
| Phase 3 Marine emissions (tugboat and work boat) | 0.04 | 0.53 | 0.03 | 0.03 |
| Total Tons | 0.66 | 6.77 | 0.313 | 0.291 |
| Total Workdays | 275 | 275 | 275 | 275 |
| Average Daily Emissions (pounds per day) | 4.80 | 49.24 | 2.28 | 2.12 |
| BAAQMD Construction Threshold (average pounds per day) | 54 | 54 | 82 | 54 |
| Significant Impact? | No | No | No | No |

NOTES:

BAAQMD = Bay Area Air Quality Management District; $NO_X$ = nitrogen oxides; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; $PM_{10}$ = particulate matter 10 microns or less in diameter; ROG = reactive organic gases
See Appendix C for the emissions estimate calculations and all of the associated assumptions.

SOURCE: Data compiled by Environmental Science Associates in 2021

As shown in Table 3.3-4, estimated emissions of ROG, NOx, $PM_{10}$, and $PM_{2.5}$ would not exceed the applicable significance thresholds, resulting in a **less-than-significant impact**. While it is expected that levee foundation soils removed are sandy soils appropriate for reuse for the tidal marsh reconstruction; it is possible that some portion of the foundation soils would require export and disposal offsite, and additional imported soil would then be required for the tidal marsh reconstruction. However, the emissions in Table 3.3-4 from on-road truck hauling (2,250 trips) only account for two percent of the total project (NOx) emissions, which are dominated by on-site construction equipment. Therefore, the potential increase in truck transport to accommodate additional export and import of foundational soil, if required, would only marginally increase project NOx emissions and the impact would remain less than significant should this additional transport be required.

In addition to exhaust emissions, emissions of fugitive dust would be generated by Project-related construction activities associated with grading and earth disturbance, travel on paved and unpaved roads, and other construction-related activities. With regard to fugitive dust emissions, the BAAQMD CEQA Guidelines focus on implementing dust control measures rather than

comparing estimated levels of fugitive dust to quantitative significance thresholds. Chapter 2, *Project Description*, does not include any Project-specific measures for controlling fugitive dust emissions; therefore, a **potentially significant impact** would result from non-exhaust particulate emissions associated with construction activities.

To reduce cumulatively considerable impacts related to emissions of fugitive dust associated with Project construction to a less-than-significant level, implementation of **Mitigation Measure 3.3-1**, which includes BAAQMD's applicable recommended fugitive dust control measures, would be required. Implementing Mitigation Measure 3.3-1 would reduce the impact associated with fugitive dust emissions to a less-than-significant level by requiring implementation of BAAQMD's applicable recommended fugitive dust control measures. With implementation of Mitigation Measure 3.3-1, Project construction would not result in a cumulatively considerable net increase of fugitive dust emissions, and the impact would be **less than significant with mitigation**.

## Mitigation Measures

**Mitigation Measure 3.3-1: BAAQMD Basic Construction Measures.** The Project applicant and/or its construction contractors shall comply with the following applicable BAAQMD Basic Construction Mitigation Measures:

***BAAQMD Basic Construction Measures***

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 and railcars 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 is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 mph.
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. 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 the California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.
7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified visible emissions evaluator.
8. Post a publicly visible sign with the telephone number and person to contact at the City of San Rafael regarding dust complaints. This person shall respond and take corrective action within 48 hours. BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

**Impact Significance After Mitigation:** Less than Significant. The project applicant and contractors would implement Mitigation Measure 3.3-1 (BAAQMD Basic Construction Measures) for construction activities. This measures would ensure that the Project fully addresses BAAQMD thresholds for control of fugitive dust.

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**Impact 3.3-3: The Project could expose sensitive receptors to substantial pollutant concentrations. (*Less than Significant with Mitigation*)**

### Construction Impacts

The HRA quantified cancer risks, chronic non-cancer health hazards, and average annual $PM_{2.5}$ concentrations for nearby receptors based on the Project's annual-average $PM_{10}$ and $PM_{2.5}$ emissions, and compared these to BAAQMD's corresponding thresholds of significance (Appendix C). To evaluate cancer health impacts, the maximum incremental cancer risk from inhalation exposure to TACs was calculated following the guidelines established by OEHHA. Non-cancer health risk is based on hazard indices established by OEHHA for chronic (long-term) exposures.

Assuming that construction of the Project would occur in three periods spanning three years between 2023 and 2025, the annual-average construction emissions associated with the Project were determined for the purpose of the HRA. It was assumed that the MEIR would be exposed to the annual-average TAC concentrations throughout the construction period; however, during the actual construction process, the location of equipment would vary within the Project site, and TAC concentrations at the MEIR would change. Placement of discrete cartesian receptors, as described above, allowed for an examination of TAC concentrations throughout the vicinity of construction activities.

Construction-related $PM_{10}$ exhaust emissions, calculated as described in the *Approach to Analysis* section, were used as a surrogate for DPM emissions. This assumption is also conservative because DPM represents a portion of total particulate emissions from exhaust that is closer to the $PM_{2.5}$ fraction, but is consistent with regulatory guidance.

Annual-average emissions rates for the worst-case construction scenario were converted from tons per year to grams per second to estimate annual-average concentrations, which included the polygon area source, volume sources, and line area source. The variable-emissions scenario in AERMOD was used to accurately restrict construction emissions to occur only within daytime construction hours.

Once the Project's DPM concentrations at the sensitive receptors were calculated, OEHHA's Risk Assessment Guidelines were used to derive both cancer and non-cancer chronic risks. Consistent with the BAAQMD CEQA Guidelines, a three-year exposure duration was used, with exposure starting in the third trimester to most conservatively assume a child in utero. Including this life stage applies the most conservative weighting for exposures to account for increased sensitivity to carcinogens from late pregnancy through childhood, known as an Age Specific Factor. The OEHHA default breathing rates and fraction at time of residence for all age groups were also included.

**Table 3.3-5** presents the unmitigated HRA results for the Proposed Project's construction period, based on OEHHA calculation methodologies.

**TABLE 3.3-5**
**RESULTS OF HEALTH RISK ASSESSMENT FOR UNMITIGATED PROJECT CONSTRUCTION[A]**

| Parameters | Cancer Risk[b] | $PM_{2.5}$[c] | Chronic HI[d] |
|---|---|---|---|
| Maximally Exposed Individual Receptor (resident) | 12.9 | 0.05 | 0.01 |
| BAAQMD Thresholds of Significance | **10** | **0.3** | **1.0** |
| *Exceeds Threshold?* | *Yes* | *No* | *No* |

NOTES:

BAAQMD = Bay Area Air Quality Management District; HI = Hazard Index; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a. The results represent the health risks associated with construction of the Project.
b. Chances in 1 million.
c. Particulate matter of 2.5 microns or less concentration is expressed as annual average in micrograms per cubic meter ($\mu g/m^3$).
d. Hazard Indices (HI) are dimensionless.

SOURCE: Data compiled by Environmental Science Associates in 2021 (see Health Risk Assessment in Appendix C)

The maximum annual-average $PM_{2.5}$ concentration would be 0.05 $\mu g/m^3$ at the MEIR, which would not exceed BAAQMD's significance threshold of 0.3 $\mu g/m^3$. TAC exposure from the Project's construction emissions would result in a maximum chronic hazard index of 0.01, which is below the BAAQMD threshold of 1.0. However, based on the assessment methods described above, the MEIR would be exposed to an incremental cancer risk of 12.9 in 1 million, which is greater than the BAAQMD threshold of 10 in 1 million. Therefore, overall Project-related construction activities would expose existing sensitive receptors to substantial pollutant concentrations, and this impact would be **significant**.

Implementing **Mitigation Measure 3.3-2** would reduce cancer risks from Project construction to below the applicable threshold. Mitigation Measure 3.3-2 would require the project applicant and/or its construction contractors to use EPA Tier 4 engines for the off-road construction equipment. This would minimize toxic airborne risks associated with the diesel combustion exhaust from Project construction. **Table 3.3-6** presents the HRA results associated with the Proposed Project's mitigated construction emissions.

**TABLE 3.3-6**
**RESULTS OF HEALTH RISK ASSESSMENT FOR MITIGATED PROJECT CONSTRUCTION[A]**

| Parameter | Cancer Risk[b] | $PM_{2.5}$[c] | Chronic HI[d] |
|---|---|---|---|
| Maximally Exposed Individual Receptor (resident) | 4.9 | 0.02 | <0.01 |
| BAAQMD Thresholds of Significance | **10** | **0.3** | **1.0** |
| *Exceeds Threshold?* | *No* | *No* | *No* |

NOTES:

BAAQMD = Bay Area Air Quality Management District; HI = Hazard Index; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a. The results represent the health risks associated with construction of the Project.
b. Chances in 1 million.
c. Particulate matter of 2.5 microns or less concentrations are expressed as annual average in micrograms per cubic meter ($\mu g/m^3$).
d. Hazard Indices (HI) are dimensionless.

SOURCE: Data compiled by Environmental Science Associates in 2021 (see Health Risk Assessment in Appendix C)

Based on implementation of Mitigation Measure 3.3-2 as summarized above, the MEIR would be exposed to an incremental cancer risk of 4.9 in 1 million, which is below the BAAQMD threshold of 10 in 1 million. Overall, mitigated Project-related construction activities would not expose existing sensitive receptors to substantial pollutant concentrations.

### Mitigation Measures

**Mitigation Measure 3.3-1:** ***BAAQMD Basic Construction Measures.*** (See Impact 3.3-2.)

**Mitigation Measure 3.3-2:** ***EPA Tier 4 Engines*****.** The Project applicant and/or its construction contractors shall be required to use off-road diesel construction equipment compliant with EPA Tier 4 nonroad engine standards. Before construction activities begin, the construction contractor and/or the Project applicant shall prepare an equipment list that identifies each piece of off-road equipment to be operated at the Project site by its equipment identification number and demonstrates that each piece of equipment meets EPA Tier 4 nonroad engine standards. The list shall be made available at the construction site and shall be updated when new or replacement construction equipment is brought to the site.

**Impact Significance after Mitigation:** Less than Significant. The Project applicant and contractors would implement Mitigation Measure 3.3-1 (BAAQMD Basic Construction Measures) to minimize the generation and emission of dust during construction, and Mitigation Measure 3.3-2 (EPA Tier 4 Engines), which requires the use of cleaner burning engines and would reduce TAC emissions below the established threshold.

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**Impact 3.3-4: The Project would not result in emissions that lead to odors affecting a substantial number of people.** ***(Less than Significant)***

### Construction Emissions

BAAQMD has developed a list of recommended odor screening distances for specific odor sources. If a proposed project would include the operation of an odor source, the screening distances should be used to evaluate the impact on existing sensitive receptors. BAAQMD recommends using the screening distances as indicators for the amount of additional analysis required, rather than as the sole indicator of impact significance (BAAQMD 2010). Combustion of diesel fuel by off-road equipment, harbor craft, and heavy-duty trucks used to construct the Project may generate emissions that lead to odors. However, BAAQMD does not have an odor screening distance for construction activity, and thus, this methodology cannot be relied upon for this impact assessment. As described in Section 3.3.2, *Environmental Setting*, there are sensitive receptors (e.g., residences, schools) in the immediate vicinity of the Project site.

Diesel combustion emissions from Project construction would be temporary, intermittent, and spatially dispersed, and therefore, the associated odors would dissipate quickly. Odor impacts associated with diesel combustion during construction activities would be **less than significant**.

During excavation activities, organic materials would be temporarily exposed to the air. However, such exposure is not anticipated to result in substantial emission of odors, because water levels would be drawn down below the organic layer, allowing sediments to partially dry out, rather than stagnating and generating odors. Also, Project construction activities would include the covering of this layer early during the construction period. As a result, this impact would be **less than significant**.

**Mitigation:** None required.

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## Cumulative Impacts

**Impact 3.3-5: The Project could result in cumulative emissions of air pollutants. (*Less than Significant with Mitigation*)**

### Criteria Pollutants (Less than Significant)

As discussed above, regional air pollution is by its very nature largely a cumulative impact. Emissions from past, present, and future projects contribute to the region's adverse air quality on a cumulative basis. No single project by itself would be sufficient in size to result in regional nonattainment of ambient air quality standards. Instead, a project's individual emissions contribute to existing cumulative adverse air quality impacts (BAAQMD 2017a:2-1).

The project-level thresholds for CAP emissions are based on the levels below which new sources are not anticipated to result in a considerable net increase in nonattainment CAP emissions. Therefore, the cumulative CAP emissions analysis is presented in Impact 3.3-2. As discussed in Impact 3.3-2, the Proposed Project would not result in a cumulatively considerable contribution to regional CAP emissions, and the cumulative impact would be **less than significant**.

### Toxic Air Contaminants (Less than Significant with Mitigation)

In accordance with BAAQMD guidance for a complex source, all TAC and $PM_{2.5}$ sources within a 1,000-foot radius of the maximally exposed individual receptor were identified. The evaluation followed a conservative approach to evaluate the Proposed Project's cumulative health risks, using BAAQMD's Health Risk Screening and Distance Multiplier Tools. The results were as follows:

- One existing permitted stationary source was located within 1,000 feet of the unmitigated construction MEIR.
- No permitted stationary sources were located within 1,000 feet of the mitigated construction MEIR.
- No highways or major roadways were found within 1,000 feet of either the unmitigated or mitigated MEIR.
- The cancer and non-cancer chronic risks and annual-average $PM_{2.5}$ concentrations were calculated and are included in **Table 3.3-7** and **Table 3.3-8**. See Appendix C for the detailed calculations and methods used to derive these values.

**TABLE 3.3-7**
**RESULTS OF CUMULATIVE UNMITIGATED PROJECT HEALTH RISK ASSESSMENT[A]**

| Source | Health Risks at the MEIR | | |
|---|---|---|---|
| | Cancer Risk[b] | $PM_{2.5}$[c] | Chronic Hi[d] |
| Project | 12.9 | 0.05 | 0.01 |
| Highway/Major Street[e] | – | – | – |
| Stationary Sources[f] | 0.57 | <0.01 | 0.01 |
| Cumulative | 13.5 | 0.05 | 0.01 |
| BAAQMD Thresholds of Significance | **100** | **0.8** | **10.0** |
| *Exceeds Threshold?* | *No* | *No* | *No* |

NOTES:

BAAQMD = Bay Area Air Quality Management District; HI = Hazard Index; MEIR = maximally exposed individual receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a. The results represent the cumulative health risks associated with construction of the Project and all other sources of toxic air contaminant (TAC) and $PM_{2.5}$ emissions within a 1,000-foot radius of the MEIR.
b. Chances in 1 million.
c. Concentrations are expressed as micrograms per cubic meter ($\mu g/m^3$).
d. Hazard indices (HI) are dimensionless.
e. No highways or major streets (annual average daily traffic >10,000) within 1,000 feet of the MEIR.
f. One permitted stationary source within 1,000 feet of the MEIR: City of San Rafael Department of Public Works' (FACID 17906) generators.

SOURCE: Data compiled by Environmental Science Associates in 2021 (see Health Risk Assessment in Appendix C)

**TABLE 3.3-8**
**RESULTS OF CUMULATIVE MITIGATED PROJECT HEALTH RISK ASSESSMENT[A]**

| Source | Health Risks at the MEIR | | |
|---|---|---|---|
| | Cancer Risk[b] | $PM_{2.5}$[c] | Chronic Hi[d] |
| Project | 4.9 | 0.02 | <0.01 |
| Highway/Major Street[e] | -- | -- | -- |
| Stationary Sources[f] | -- | -- | -- |
| Cumulative | 4.9 | 0.02 | <0.01 |
| BAAQMD Thresholds of Significance | **100** | **0.8** | **10.0** |
| *Exceeds Threshold?* | *No* | *No* | *No* |

NOTES:

BAAQMD = Bay Area Air Quality Management District; HI = Hazard Index; MEIR = maximally exposed individual receptor; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter

a. The results represent the cumulative health risks associated with construction of the Project and all other sources of toxic air contaminant (TAC) and $PM_{2.5}$ emissions within a 1,000-foot radius of the MEIR.
b. Chances in 1 million.
c. Concentrations are expressed as micrograms per cubic meter ($\mu g/m^3$).
d. Hazard indices (HI) are dimensionless.
e. No highways or major streets (annual average daily traffic >10,000) within 1,000 feet of the MEIR.
f. No permitted stationary sources within 1,000 feet of the MEIR.

SOURCE: Data compiled by Environmental Science Associates in 2021 (see Health Risk Assessment in Appendix C)

Table 3.3-7 and Table 3.3-8 present the results of the cumulative HRA for the unmitigated and mitigated Project construction periods, respectively. Based on the assessment methods described above, the unmitigated and mitigated MEIRs would be exposed to an incremental cancer risk of up

to 13.5 in 1 million and 4.9 in 1 million, respectively. Both of these risk levels are below BAAQMD's cumulative threshold of 100 in 1 million. The annual-average $PM_{2.5}$ concentration at the unmitigated and mitigated MEIRs would be to 0.05 $\mu g/m^3$ and 0.02 $\mu g/m^3$, respectively, both below the cumulative threshold of 0.8 $\mu g/m^3$. The chronic non-cancer hazard index would be up to 0.01, which is below the cumulative threshold of 10.0.

Implementing Mitigation Measure 3.3-2, described above under Impact 3.3-3, would reduce cancer risks from Project construction to below the applicable threshold by requiring the use of off-road diesel construction equipment compliant with EPA Tier 4 nonroad engine standards. The health risk impact would not be cumulatively considerable, and the cumulative impact would be **less than significant with mitigation**.

### Mitigation Measures

**Mitigation Measure 3.3-2: *EPA Tier 4 Engines*.** (See Impact 3.3-3.)

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## 3.3.5 References

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# 3.4 Biological Resources

This section addresses impacts on biological resources that may result from construction and operation of the Proposed Project. The analysis of terrestrial biological resources addresses areas both within the Project footprint and adjacent habitats outside of these boundaries. In instances where only the Project footprint is referenced, the term "Project site" is used within this section. The term "study area" is used to describe the greater area of biological analysis for potential impacts, and includes Tiscornia Marsh, Pickleweed Park, Albert J. Boro Community Center and Pickleweed Park, and potential upland staging areas. The study area also includes aquatic habitat within the construction footprint, the adjacent San Rafael Creek, and San Rafael Bay. Terrestrial resources described in this section include vegetation communities, such as tidal salt marsh, diked marsh, tidal waters/mudflat, pond, and associated wildlife; and special-status plants and wildlife (federal or state endangered, threatened, proposed, and candidate species; and state species of concern).

The analysis of aquatic resources addresses native fish species and their aquatic habitat, as well as marine mammals and other sensitive natural communities, within the Project site and the greater study area. Special-status fish aquatic species included in this section are those designated by federal or state agencies as endangered, threatened, or proposed for listing, candidate species; and state or local species of concern. The existing hydrology and water quality conditions within the study area are discussed only as they relate to fisheries resources, with a more detailed discussion of impacts on hydrology and water quality provided in Section 3.6, *Hydrology and Water Quality*.

This section identifies the federal, state, and local regulations pertaining to biological resources expected in the study area. Information used in the preparation of this report included regional biological studies the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB; CDFW 2021), California Native Plant Society Electronic Inventory (CNPS 2021), U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) species list (USFWS 2021), reconnaissance-level field surveys, and other biological literature.

Habitat types and associated wildlife were identified using records, field observations, and aerial imagery. Environmental Science Associates biologists conducted two reconnaissance-level surveys of the study area on December 19, 2019 and May 13, 2020 to gather information and verify existing data on habitat types, sensitive natural communities, and potential habitat use of wildlife on and surrounding the Project site. The findings of this review were summarized in the *Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project Habitat Assessment* (ESA 2020).

## 3.4.1 Environmental Setting

### Regional Setting

The study area is located in Marin County along San Rafael Bay. Marin County has a diverse topography and microclimate, and has an associated high diversity of vegetation and wildlife, although development in the region has resulted in a substantial reduction in land available for native flora and fauna. The study area is within the City of San Rafael at the mouth of San Rafael Creek, a tidal channel that is largely confined by urban development.

## Project Setting

The description of habitat types presented herein is based on field observations, review of previous biological studies using terminology from the standard *Preliminary Descriptions of the Terrestrial Natural Communities of California* (Holland 1986). Plant communities generally correlate with wildlife habitat types, which were classified and evaluated using *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). The following habitat types occur in the study area: ruderal/nonnative grassland, turf, coastal scrub, landscaped, developed, tidal salt marsh, diked marsh, tidal waters/mudflat, and pond (**Table 3.4-1**). The distribution of habitat types within the study area is presented in **Figure 3.4-1**. Dominant vegetation and wildlife observed during the reconnaissance surveys are described below for each habitat type.

**TABLE 3.4-1**
**HABITAT TYPES BY ACREAGES**

| Habitat Type | Acreage[a] |
|---|---|
| **Upland Habitat Types** | |
| Ruderal/Non-Native Grassland | 1.43 |
| Turf | 4.72 |
| Coastal Scrub | 0.32 |
| Landscaped | 3.32 |
| Developed | 3.90 |
| **Aquatic Habitat Types** | |
| Tidal Salt Marsh | 7.59 |
| Diked Marsh | 3.95 |
| Tidal Waters/Mudflat | 12.75 |
| Pond | 0.07 |
| **TOTAL** | **38.05** |

NOTES:
a. GIS calculations may not reflect exact acreage of study area due to rounding.

## Vegetative Communities and Wildlife Habitat Types

### *Upland Habitat Types*

#### Ruderal/Non-native Grassland/Turf

Terrestrial portions of the study area are dominated by ruderal vegetation and non-native grassland. These habitats are most prevalent in areas subject to frequent disturbances often due to maintenance activities or heavy use. Within the study area, this habitat occurs mostly along the trail and is characterized by the dense growth of non-native grasses and forbs. Common non-native grasses frequent within the study area include wild oat (*Avena* spp.), Italian ryegrass (*Festuca perennis*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), seaside barley (*Hordeum marinum*), and foxtail barley (*Hordeum murinum*). Non-native invasive forbs within this habitat include fennel (*Foeniculum vulgare*), bristly oxtongue (*Helminthotheca echioides*), and wild radish (*Raphanus sativus*). Some native grasses and herbs occur intermittently throughout the ruderal vegetation and non-native grassland including pineapple


SOURCE: aerial (ESRI)

Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project

**Figure 3.4-1**
Habitat Types

ESA

weed (*Matricaria discoidea*) and meadow barley (*Hordeum brachyantherum*). Several native and non-native trees occur within the ruderal/non-native grassland along the trails including coast live oak (*Quercus agrifolia*), Canary Island date palm (*Phoenix canariensis*), and acacia (*Acacia* sp.). Turf occurs at the soccer field in the study area. The field appears regularly mowed and contains non-native grasses and forbs including annual blue grass (*Poa annua*) and clover (*Trifolium* spp.).

In areas adjacent to trails and parks that are utilized by humans, wildlife use is likely limited. Canada geese (*Branta canadensis*) were seen foraging in the turf during the reconnaissance survey. Some other common wildlife that may use non-native grassland and ruderal habitats include western fence lizard (*Sceloporus occidentalis*), black-tailed jackrabbit (*Lepus californicus*) and other small mammals, and western meadowlark (*Sturnella neglecta*). The non-native grassland and ruderal habitat in areas directly adjacent to tidal and non-tidal wetlands are important as refugia habitat for marsh wildlife during high tides, storms, and flood events. Scattered trees next to the trail likely provide minimal wildlife habitat, but may provide foraging and nesting habitat for a variety of birds.

### Coastal Scrub

A small strip of uplands between the tidal marsh and trail is comprised of coastal scrub habitat, dominated by shrubs such as California sagebrush (*Artemisia californica*) and coyote brush (*Baccharis pilularis*). This area was planted several years ago by STRAW (Students and Teachers Restoring a Watershed) and Point Blue Conservation Science. The area contains several non-native and invasive species including pride of madeira (*Echium candicans*), dwarf mallow (*Malva neglecta*), and Canarian sea lavender (*Limonium perezii*), as well as non-native grasses and herbs found in the non-native grassland/ruderal habitat. Some native grasses and herbs also occur throughout the scrub habitat including creeping wildrye (*Elymus triticoides*) and California mugwort (*Artemesia douglasiana*).

The coastal scrub habitat in the study area provides refugia habitat for marsh wildlife during high tide, storm, and flood events. Birds that may forage within coastal scrub habitat include San Pablo song sparrow (*Melospiza melodia samuelis*), white-crowned sparrow (*Zonotrichia leucophrys*), and red-winged blackbird (*Agelaius phoeniceus*).

### Landscaped

Several different landscaped areas exist within the study area surrounding the Albert J. Boro Community Center and Pickleweed Park, and nearby trails (see Appendix D). Several trees are found throughout these landscaped areas including sweet gum (*Liquidambar styraciflua*) and black oak (*Quercus kelloggii*). Mowed grassy areas and wood-chipped areas exist under the tree canopy. Mowed turf areas include mostly non-native grasses and herbs also found in the soccer field turf.

Trees can generally provide nesting, roosting, and foraging habitat for many species of birds. However, because these trees are near developed areas, they may only provide nesting opportunities to birds willing to nest near areas of frequent human disturbance, such as California scrub jay (*Aphelocoma californica*), northern mockingbird (*Mimus polyglottos*), and house finch (*Haemorhous mexicanus*). Other wildlife that may inhabit these areas include raccoon (*Procyon lotor*) and Virginia opossum (*Didelphis virginiana*).

### Developed

Developed areas include the community center buildings, a parking lot, and paved and unpaved trails (see Photos 1, 4, and 5 in the Photo attachment of Appendix D). The unpaved trail around the study area separates the tidal marsh from the diked marsh, soccer field, and other landscaped and developed areas. Trees and shrubs are found scattered throughout the developed areas surrounding the parking lot and buildings and include non–native species such as golden rain tree (*Koelreuteria paniculata*), Marina strawberry tree (*Arbutus* x 'Marina'), and Crimson bottlebrush (*Callistemon citrinus*).

These trees can provide habitat to birds and other wildlife, but the buildings and paved areas themselves support few biological resources. The unpaved trail is likely used by wildlife to move between other wetland and upland habitats. Developed areas provide limited wildlife habitat and usually support only generalist, and sometimes non-native wildlife species that are tolerant of human presence and activities, such as house sparrow (*Passer domesticus*) and Virginia opossum.

### Transition Zone

The transition zone within the study area encompasses upland habitat types adjacent to the tidal marsh. In the study area, the transition zone is a very narrow band, typically 5 to 30 feet wide, that begins at the edge of the tidal marsh and contains ruderal/non-native grassland or coastal scrub habitat before it abuts against the pedestrian trail. The transition zone is important refugia habitat for marsh wildlife during high tides, storms, and flood events. However, because the transition zone is so narrow and close to developed areas, wildlife utilizing this transition zone may be exposed to excessive predation.

## Aquatic Habitat Types

Aquatic resources within the study area that have potential to be considered federally or state jurisdictional include the aquatic habitat types described below. The aquatic habitats were mapped based on aerial imagery and the two reconnaissance-level surveys of the study area. The distribution of aquatic habitat types (tidal marsh, diked marsh, tidal waters, and pond) in the study area is shown in Figure 3.4-1.

### *Tidal Salt Marsh*

Tidal salt marsh, found along the edge of San Rafael Bay and San Rafael Creek in the study area, is typical of tidal salt marsh in San Rafael Bay and contains low and mid-high marsh zones. Due to the small size of the tidal salt marsh and the mix of the mid and high marsh plants at this site, the latter two zones are lumped below into the mid-high marsh zone. Vegetation communities in tidal wetlands are defined by tidal hydroperiod, salinity, soils, drainage, and species competition.

### Low Marsh Zone

The low marsh zone consists of the marsh directly adjacent to San Rafael Bay, San Rafael Creek, and adjacent to small channels within the interior of the marsh. Low marsh generally occurs between elevations 3.3 and 5.5 feet North American Vertical Datum (NAVD), or approximately

mean tide level (MTL) to mean high water (MHW) (ESA 2018). The dominant plant species within the low marsh zone is California cordgrass (*Spartina foliosa*).

### Mid-High Marsh Zone

The mid-high marsh zone occurs in the band between the uplands and trail and the narrow strip of low marsh along the San Rafael Bay shoreline. Mid-high marsh habitat generally occurs between 5.5 and 7.3 feet NAVD, or between MHW and the highest tide (ESA 2018).

Vegetation within this zone is dominated by pickleweed (*Salicornia pacifica*). Jaumea (*Jaumea carnosa*) is also present in the lower elevations of the mid-high marsh zone. Many other species are found at the upper elevations of the high marsh and at the edge between high marsh and uplands including native salt grass (*Distichlis spicata*), alkali heath (*Frankenia salina*), and gumplant (*Grindelia stricta*). Both the size in area and the amount of plant diversity are greater in the mid-high marsh than in the low marsh zone within the study area. Some other native species encountered intermittently within the mid-high marsh habitat include marsh rosemary (*Limonium californicum*) and fat hen (*Atriplex prostrata*).

Tidal salt marsh vegetation throughout the study area provides nesting and foraging opportunities and cover for marsh bird species, including mallard (*Anas platyrhynchos*), great blue heron (*Ardea herodias*), great egret (*Ardea alba*), marsh wren (*Cistothorus palustris*), San Pablo song sparrow, red-winged blackbird, salt marsh common yellowthroat *(Geothlypis trichas sinuousa),* and small mammals such as raccoon and California vole (*Microtus californicus*).

Raptors that are typical of marsh habitats include northern harrier (*Circus hudsonius*), red-tailed hawk (*Buteo jamaicensis*), white-tailed kite (*Elanus leucurus*), and American kestrel (*Falco sparverius*). During winter high tides, ducks that may be found in tidal marsh environments include northern shoveler (*Anas clypeata*), American wigeon (*Anas americana*), northern pintail (*Anas acuta*), gadwall (*Anas strepera*), and canvasback (*Aythya valisineria*).

Special-status wildlife that may occur within tidal marsh habitats includes salt marsh harvest mouse (*Reithrodontomys raviventris*), California Ridgway's rail (*Rallus obsoletus obsoletus*), and California black rail (*Laterallus jamaicensis*).

## *Diked Marsh*

Diked marsh habitat in the study area is dominated by pickleweed and contains varying densities of this plant. With a slight increase in elevation, pickleweed intergrades into areas composed of an assortment of hydrophytic species including, natives salt grass and alkali heath, and non-natives fat hen and rabbitsfoot grass (*Polypogon monspeliensis*). Most of the diked marsh in the study area occurs west of the tidal salt marsh, behind the levee/trail. However, two other smaller areas of diked marsh occur in the northwest area of the study area around a pond and in an area of lower elevation (refer to Figure 3.4-1).

Similar to tidal salt marsh, diked marsh can provide nesting, foraging, and refugia habitat for wildlife associated with tidal marsh vegetation. The lower water levels and sparse vegetation can attract foraging and nesting shorebirds such as sandpiper (*Calidris* spp.), black-necked stilt

(*Himantopus mexicanus)*, American avocet (*Recurvirostra americana*), short-billed dowitcher (*Limnodromus griseus*), and killdeer (*Charadrius vociferous*). Northern harrier commonly hunt over open marshes such as those on the Project site. Diked marshes also provide habitat for small rodents that occur in the tidal marshes in the region including salt marsh harvest mouse.

### *Tidal Waters*

San Rafael Bay, San Rafael Creek, and small channels within the tidal marsh are characterized by open water bordered by stands of cordgrass. The tidal waters within the study area occur within intertidal elevations and thus are mudflat at low tide (see Photos 3 and 6 in the Photo attachment of Appendix D). Subtidal habitat occurs in San Rafael Creek and in San Rafael Bay adjacent to the study area where elevations are below the tide range and the substrate is, as a result, continuously submerged. Intertidal mudflat occurs upslope of the subtidal areas and in a few smaller tidal channels within the study area and is generally devoid of vegetation.

Mudflat within San Rafael Bay provides foraging opportunities for shorebirds. Migratory shorebirds that may forage in the mudflats along San Rafael Bay and San Rafael Creek during low tide, as well as the channel banks, include dunlin (*Calidris alpina*), willet (*Tringa semipalmata*), black-necked stilt, American avocet, marbled godwit (*Limosa fedoa*), and several sandpiper species.

During winter high tide, the shallow waters may provide habitat for dabbling ducks such as mallard, northern shoveler, and gadwall; and the deeper waters may provide foraging and resting habitat for grebes, cormorants, and diving ducks.

San Rafael Creek and the nearshore waters of San Rafael Bay provide shallow subtidal and intertidal benthic estuarine habitat for a wide variety of fish, wildlife, and marine invertebrate species. Riprap and other shoreline structures, such as piles, provide some solid substrates. A 12-month aquatic habitat survey of the creek and nearshore waters adjacent to Tiscornia Marsh was conducted for the U.S. Army Corps of Engineers (USACE) by the USFWS in 1989 (Weinrich 1990). Benthic samples at the mouth of the creek yielded numerous polychaete worms, as well as clams and snails. Three species of crabs were found: Dungeness (*Metacarcinus magister*), red rock (*Cancer productus*), and yellow shore crabs (*Hemigrapsus oregonensis*). Twenty-two species of fish were captured in the creek and in San Rafael Bay during the yearlong survey. The most common species (accounting for 91 percent of the total fish captured) were northern anchovy (*Engraulis mordax*), shiner perch *(Cymatogaster aggregata)*, yellowfin goby *(Acanthogobius flavimanus)*, threadfin shad *(Dorosoma petenense)*, and butter sole *(Isopetta isolepis)*. Seventeen species captured are endemic to California waters. Five introduced species were captured: Mississippi silverside (*Menidia audens*), threadfin shad, striped bass (*Morone saxatilis*), yellowfin goby, and chameleon goby (*Tridentiger trigonocephalos*). Other aquatic species found included jellyfish, comb jellies, and two species of bay shrimp (Weinrich 1990).

From 2015 through 2020, Environmental Science Associates conducted annual fish sampling in the (restored) Hamilton Wetlands Preserve, approximately 6 miles north of Tiscornia Marsh. Based on proximity of the study area to the Hamilton Wetlands Preserve, these surveys are a useful record of fish species that may occur within this portion of the San Francisco Bay-Delta.

This would include San Rafael Bay and the tidal portions of San Rafael Creek. The Hamilton Wetlands Preserve surveys resulted in the capture and identification of approximately 2,500 individual fish, representing 12 native species: northern anchovy, Pacific herring (*Clupea pallasii*), Pacific staghorn sculpin (*Leptocottus armatus*), three-spined stickleback (*Gasterosteus aculeatus*), topsmelt (*Atherinops affinis*), California halibut (*Paralichthys californicus*), and Chinook salmon (*Oncorhynchus tshawytscha*); as well as non-native species: chameleon goby, yellowfin goby, rainwater killifish (*Lucania parva*), Shokihaze goby (*Tridentiger barbatus*), and striped bass (ESA et al. 2021).

### *Pond*

A small created pond occurs in the northwest corner of the study area near San Rafael Creek. The open water pond may provide foraging and resting habitat for waterfowl and migrating birds, but contains marginal habitat for wildlife due to its small size, steep pond edges with limited cover, and a tall fence around the pond (see Photo 8 in the Photo attachment of Appendix D).

## Special-Status Species

A number of species known, or with potential, to occur in the study area vicinity are protected pursuant to federal and/or state endangered species laws, or have been designated Species of Special Concern by the CDFW. In addition, Section 15380(b) of the CEQA Guidelines provides a definition of rare, endangered, or threatened species that are not included in any listing.[1] Species recognized under these terms are collectively referred to as "special-status species." For the purposes of this EIR, special-status species include the following:

1. Species listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (FESA) (50 CFR 17.12 [listed plants], 17.11 [listed animals], and various notices in the Federal Register [FR] [proposed species]).
2. Species that are candidates for possible future listing as threatened or endangered under the FESA (61 FR 40, February 28, 1996).
3. Species listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CESA) (14 Cal. Code Regs. 670.5).
4. Species designated by the CDFW as species of special concern.[2]
5. Species designated as "fully protected" by the state (there are about 35, most of which are also listed as either endangered or threatened).[3]

[1] For example, vascular plants listed as rare or endangered or as List 1 or 2 by CRPR are considered to meet Section 15380(b).

[2] A California species of special concern is one that: has been extirpated from the state; meets the state definition of threatened or endangered but has not been formally listed; is undergoing or has experienced serious population declines or range restrictions that put it at risk of becoming threatened or endangered; and/or has naturally small populations susceptible to high risk from any factor that could lead to declines that would qualify it for threatened or endangered status.

[3] The "fully protected" classification was California's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. The designation can be found in the Fish and Game Code.

6. Raptors (birds of prey), which are specifically protected by California Fish and Game Code Section 3503.5.[4]
7. Plants listed as rare or endangered under the California Native Plant Protection Act (California Fish and Game Code, Section 1900 et seq.).
8. Species that meet the definitions of rare and endangered under CEQA. CEQA Section 15380 provides that a plant or animal species may be treated as "rare or endangered" even if not on one of the official lists (CEQA Guidelines, Section 15380).
9. Plants considered to be "rare, threatened or endangered in California" under the California Rare Plant Ranking system (CRPR), which includes Rank 1A, 1B, 2A, and 2B as well as some Rank 3 and 4[5] plant species.

Appendix D provides a comprehensive list of the special-status species considered in the evaluation of the Proposed Project. This list was created following review of the CNDDB (CDFW 2021), CNPS Electronic Inventory (CNPS 2021), and the USFWS IPaC report (USFWS 2021). Based on a review of the biological literature of the region, recent biological reports for the study area, and an evaluation of the study area's habitat conditions (ESA 2020), Environmental Science Associates determined whether each species has a low, moderate, or high potential to occur in the study area.

Species with a low potential to occur are species whose current distribution or range does not include the study area, or species whose specific habitat requirements are not present (e.g., riparian forest). Species with a moderate potential to occur are those for whom suitable foraging or breeding habitat is present in the study area, even though the species has not been recently observed in the study area. A species was determined to have a high potential for occurrence if moderate to high quality habitat is present within the study area in addition to the area being included in the documented range of the species. Species observed or with a moderate to high potential to occur within the study area are discussed in detail below.

### Species Assessed in Detail

Of the special-status plants, animals, and fish presented in Appendix D, and other managed U.S. fisheries species and special status marine species, only the following species have a moderate to high potential to occur within the study area and are described in detail below:

[4] The inclusion of birds protected by Fish and Game Code Section 3503.5 is in recognition of the fact that these birds are substantially less common in California than most other birds, having lost much of their habitat to development, and that the populations of these species are therefore substantially more vulnerable to further loss of habitat and to interference with nesting and breeding than most other birds. It is noted that a number of raptors and owls are already specifically listed as threatened or endangered by state and federal wildlife authorities.

[5] Rank 3 plants may be analyzed under CEQA Guidelines Section 15380 if sufficient information is available to assess impacts to such plants. Factors such as regional rarity vs. statewide rarity should be considered in determining whether cumulative impacts to a Rank 4 plant are significant even if individual project impacts are not. CRPR Rank 3 and 4 plants may be considered regionally significant if, for example, the occurrence is located at the periphery of the species' range, or exhibits unusual morphology, or occurs in an unusual habitat/substrate. For these reasons, CRPR Rank 3 and 4 plants should be included in the special-status species analysis. Rank 3 and 4 plants are also included in the CNDDB Special Vascular Plants, Bryophytes, and Lichens List (CNDDB, 2021).

**Plants**

- Marin knotweed (*Polygonum marinense*)
- Suisun Marsh aster (*Symphyotrichum lentum*)
- Congested-headed hayfield tarplant (*Hemizonia congesta* subsp. *congesta*)
- Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*)

**Birds**

- California black rail (*Laterallus jamaicensis coturniculus*)
- California Ridgway's rail (*Rallus obsoletus obsoletus*)
- Northern harrier (*Circus cyaneus*),
- Salt marsh common yellowthroat (*Geothlypis trichas sinuousa*)
- San Pablo song sparrow (*Melospiza melodia samuelis*)

**Fish**

- Chinook salmon (*Oncorhynchus tshawytscha*)
- Steelhead (*O. mykiss*)
- Green sturgeon (*Acipenser medirostris*)
- Longfin smelt *(Spirinchus thaleichthys)*
- Pacific herring (*Clupea pallasii*)

**Mammals**

- Salt marsh harvest mouse (*Reithrodontomys raviventris*)
- Salt-marsh wandering shrew (*Sorex vagrans halicoetes*)
- Pacific harbor seal (*Phoca vitulina richardsi*)
- California sea lion (*Zalophus californianus*)
- Harbor porpoise (*Phocoena phocoena*)

Of these species, California Ridgway's rail, San Pablo song sparrow, and salt marsh harvest mouse have been detected within the study area.

### Special-Status Plants

Four special-status plants were determined to have a moderate likelihood to occur within the study area, and are described below. Other plant species were determined unlikely to occur based on a lack of suitable specific habitat conditions (e.g., vernal pools), associated habitat communities are not present (e.g., chaparral), lack of suitable soil conditions, or because the study area is below the elevation range of the species.

**Point Reyes bird's-beak** (*Chloropyron maritimum* ssp. *palustre*) is a California Rare Plant Rank (CRPR) 1B.2 species. Point Reyes bird's-beak is found in the heavy clay soils of coastal salt

marshes of northern San Francisco Bay and occurs at the upper end of tidal zones. It is associated with pickleweed, salt grass, fat hen, and jaumea and is rarely found in non-tidal conditions. Point Reyes bird's-beak is an annual herb in the broomrape family (Orobanchaceae) that blooms from May to October. It typically occurs in low growing marsh vegetation in coastal salt marshes at elevations ranging from 0 to 30 feet. Point Reyes bird's-beak is known to occur 1.8 miles to the south and 3.2 miles to the north from the study area within historic tidal marshes. Potentially suitable tidal marsh habitat exists in the study area; however, the tidal marsh in the study area was recently formed (within the last 50 to 150 years) and therefore likely less biologically diverse than most historic tidal marshes in the area that were formed between 2,000 and 5,000 years ago and potentially less likely to contain rare plants such as Point Reyes bird's-beak than historic tidal marshes.

**Marin knotweed** (*Polygonum marinense*), a CRPR 3.1 species, is an annual forb in the knotweed family (Polygonaceae) that blooms from May to August. It typically occurs in salt and brackish marshes between 0 to 30 feet. This species has been documented along the Marin County shoreline 2.7 miles from the study area to the north and 1.9 miles to the south in historic tidal marshes. Potentially suitable tidal marsh habitat exists in the study area; however, the tidal marsh in the study area was recently formed and therefore likely less biologically diverse than most historic tidal marshes and potentially less likely to contain rare plants such as Marin knotweed than historic tidal marshes.

**Suisun Marsh aster** (*Symphyotrichum lentum*), a CRPR 1B.2 species, is a perennial forb in the sunflower family (Asteraceae) that blooms from May to November. It typically occurs along sloughs and channels in dense marsh vegetation in freshwater and coastal brackish marsh habitat at elevations ranging from 0 to 10 feet. The plant is a tall (3 to 6 feet) perennial with fairly large violet heads having ray flowers 10 to 12 mm (half-inch) long. Historic occurrences exist along the San Pablo Bay shoreline in Marin, although the most recent observation occurs 4.2 miles from the study area across San Pablo Bay. Potentially suitable tidal marsh habitat exists in the study area.

**Congested-headed hayfield tarplant** (*Hemizonia congesta* subsp. *congesta*), a CRPR 1B.2 species, is an annual forb in the sunflower family (Asteraceae) that can have a wide blooming period between April to November. It typically occurs in grassy sites and marsh edges at elevations below 330 feet. Three occurrences exist between 4 and 5 miles to the west and north of the study area. Non-native grasslands between the trail and diked and tidal marsh provide suitable habitat for this species within the study area.

### Special-Status Animals

Fish and wildlife species that have a moderate to high likelihood to occur within the study area are described below.

#### Special-Status Fish

**Chinook salmon**. The Chinook salmon (Oncorhynchus tshawytscha) that inhabit the San Francisco Bay are comprised of three distinct races: winter-run, spring-run, and fall/late fall-run.[6] These races are distinguished by the seasonal differences in adult upstream migration, spawning,

[6] These races are referred to as Evolutionarily Significant Units.

and juvenile downstream migration. Chinook salmon are anadromous fish, spending 3 to 5 years at sea before returning to freshwater to spawn. These fish pass through San Francisco Bay waters to reach their upstream spawning grounds. In addition, juvenile salmon migrate through the Bay en route to the Pacific Ocean.

Sacramento River winter-run Chinook salmon, listed as endangered under FESA and CESA, migrate through the San Francisco Bay from December through July with a peak in March (Moyle 2002). Central Valley spring-run Chinook, listed as threatened under FESA and CESA, migrate to the Sacramento River from March to September with a peak spawning period between late August and October (Moyle 2002). The Central Valley fall/late fall-run Chinook salmon is a California species of special concern.

While all three Chinook salmon races are found in the San Francisco Bay, the Central Valley fall/late fall-run is the only race that spawns in San Francisco Bay tributary streams. However, most stream habitat in the San Francisco Bay lacks the necessary flow regime, habitat availability, and/or water quality to support spawning salmonids. Additionally, individuals are rarely documented within the Project study area or the immediate vicinity, and any occurrence would only be temporary as the surrounding Bay habitat is primarily used as a migration corridor between the Pacific Ocean and spawning habitat in the Central Valley (IEP 2018).

**Steelhead**. Similar to Chinook salmon, steelhead (O. mykiss) within California are subdivided into Distinct Population Segments (DPS) based on their life history. Within the central San Francisco Bay, both the federally threatened Central California Coast and federally threatened California Central Valley steelhead may use the channel habitat adjacent to the Project study area as a migratory corridor from the Pacific Ocean to spawning habitat.

While Central California Coast steelhead are known to occur within multiple central San Francisco Bay streams, none are in proximity to the Project study area. The nearest watershed that supports Central California Coast steelhead is the Corte Madera Creek watershed, which empties into San Francisco Bay approximately 3 miles south of the Project study area (Leidy et al. 2005). As such, any occurrence of Central California Coast steelhead within the Project study area would be temporary, and only occur as steelhead move through the open water habitat adjacent to the Project site during migration between the Pacific Ocean and freshwater spawning grounds.

**Green sturgeon**. The federally threatened, southern DPS of North American green sturgeon (Acipenser medirostris) is the most widely distributed member of the sturgeon family and the most marine-oriented of the sturgeon species, entering rivers only to spawn. Within bays and estuaries, sufficient water flow is required to allow adults to successfully orient to the incoming flow and migrate upstream to spawning grounds. Green sturgeon migrating between the Pacific Ocean and spawning habitat in the Sacramento River watershed typically travel directly through San Pablo Bay, passing through Raccoon Strait adjacent to Angel Island, and out the Golden Gate Bridge (Kelly et al. 2007). So while sturgeon do have the potential to temporarily occur year-round within the Project area, their preferred migration routes suggest a low likelihood for presence. However, green sturgeon has the potential to be present throughout all marine portions of the study area at any time of the year.

**Longfin smelt.** The longfin smelt (Spirinchus thaleichthys) is a small, slender-bodied pelagic fish listed as threatened under the CESA and is a candidate for listing under the FESA. Longfin smelt are most likely to occur within the central San Francisco Bay during the late summer months before migrating upstream in fall and winter. During winter months, when fish are moving upstream to spawn, high outflows may push many fish back into the San Francisco Bay (Moyle 2002).

**Pacific herring.** Pacific herring (Clupea pallasii) are a CDFW-managed species and are protected within the San Francisco Bay under the Marine Life Management Act, which provides guidance, in the form of Fisheries Management Plans, for the sustainable management of California's historic fisheries. CDFW, in partnership with the fishing industry and conservation groups, is currently updating the Pacific Herring Fisheries Management Plan, which will formalize a strategy for the future management of the fishery.

The Pacific herring is a small schooling marine fish that enters estuaries and bays to spawn. This species is known to spawn along the San Francisco Bay waterfronts and attach its egg masses to eelgrass, seaweed, and hard substrates such as pilings, breakwater rubble, and other hard surfaces. An individual can spawn only once during the season, and the spent female returns to the ocean immediately after spawning. Spawning usually takes place between October and March, with a peak between December and February. After hatching, juvenile herring typically congregate in the San Francisco Bay during the summer and move into deeper waters in the fall. The waterfront adjacent to the Project site is not known to be a spawning area for herring (CDFW 2019b). As such, herring are not expected to occur within the aquatic portion of the study area.

### Birds

**California black rail.** California black rail is listed as threatened under CESA and is a state fully protected species. More than 90 percent of California black rails are located in the marshes of northern San Francisco Bay, primarily San Pablo Bay and Suisun Bay. Black rails prefer marshes that are close to water, are large (interior more than 50 meters from edge), away from urban areas, and brackish to fresh with a high proportion of pickleweed (*Salicornia pacifica*), maritime bulrush (*Bolboschoenus maritimus*), and marsh gumplant (*Grindelia stricta var. angustifolia*), rush (*Juncus* spp.), and cattails (*Typha* spp.) (Spautz et al. 2005). This species nests and forages in tidal emergent wetland. California black rail has not been detected during rail surveys within Tiscornia Marsh (OEI 2011–2020). Several occurrences are documented within 5 miles of the study area (CDFW 2021). The nearest species occurrence is documented on the north side of the mouth of San Rafael Creek, in 2012 (CDFW 2021). Black rail has a moderate potential to occur in the study area.

**California Ridgway's rail.** The California Ridgway's rail (formerly known as the California clapper rail) is a federally endangered, state endangered, and California fully protected species. The California Ridgway's rail is the resident rail subspecies of northern and central California, and is currently restricted to the San Francisco Bay Estuary, with the largest populations occurring in remnant salt marshes of south San Francisco Bay. The California Ridgway's rail occurs only within salt and brackish marshes. In south and central San Francisco Bay, the California Ridgway's rail typically inhabits salt marshes dominated by pickleweed and cordgrass. Breeding occurs from mid-March through July, with peak activity in late April to late May.

The California Ridgway's rail is a secretive, hen-like waterbird that lives in salt and brackish tidal marshes in the San Francisco Bay. This species once occupied coastal California tidal marshes from Humboldt Bay southward to Morro Bay, and estuarine marshes of San Francisco Bay and San Pablo Bay to the Carquinez Strait (Raabe et al. 2010). Resident populations are currently limited to San Francisco Bay, San Pablo Bay, Suisun Bay, and associated tidal marshes.

The California Ridgway's rail occurs almost exclusively in tidal salt and brackish marshes with unrestricted daily tidal flows, adequate invertebrate prey food supply, well-developed tidal channel networks, and suitable nesting and escape cover during extreme high tides (Raabe et al. 2010). The California Ridgway's rail depends on mudflats or very shallow water within a network of tidal channels where there are both abundant invertebrate populations and taller plant material to provide cover, refuge during high tides, nesting opportunities above high tides and wave action, and protection from predators. The California Ridgway's rail relies on marsh plants such as Pacific cordgrass (*Spartina foliosa*), bulrush (*Bolboschoenus maritimus*), and pickleweed for breeding and feeding.

As part of the San Francisco Estuary Invasive Spartina Project, annual monitoring of the California Ridgway's rail at treatment sites has been conducted since 2010. California Ridgway's rails were detected in Tiscornia Marsh in 2010, 2011, 2012, 2016, 2017, and 2018. Monitoring recorded a highest minimum count of six California Ridgway's rails in 2016, 11 in 2017, and five in 2018 (OEI 2016, 2018a, 2018b). However, California Ridgway's rails were not detected during surveys in 2019 (OEI 2020). The California Ridgway's rail has a high potential to occur in the study area.

#### Northern Harrier, Salt Marsh Common Yellowthroat, San Pablo Song Sparrow, and Nesting Birds protected by the Migratory Bird Treaty Act

Northern harrier, salt marsh common yellowthroat, and San Pablo song sparrow are California Species of Special Concern. The study area provides suitable foraging habitat for northern harrier in the tidal and diked marsh, and nesting habitat for this ground-nesting species in diked marsh and a few isolated upland areas. The study area provides suitable nesting habitat in emergent marsh vegetation and tall, dense ruderal vegetation for salt marsh common yellowthroat and San Pablo song sparrow. It is likely that common species, also subject to provisions of the Migratory Bird Treaty Act (MBTA), such as house finch (*Haemorhous mexicanus*), northern mockingbird (*Mimus polyglottos*), and California towhee (*Melozone crissalis*), nest in the study area. Bird species listed under FESA and CESA, as well as non- listed birds, are afforded conservation protections. Breeding birds are protected under California Fish and Game Code Section 3503, and raptors are protected under Section 3503.5. In addition, Section 3513 of the Code and the federal MBTA (16 USC, Sec. 703 Supp. I, 1989) prohibit the killing, possession, or trading of migratory birds. Finally, Section 3800 of the Code prohibits the taking of non-game birds, which are defined as birds occurring naturally in California that are not game birds or fully protected species.

As discussed below under the *Regulatory Setting*, most migratory birds are protected from harm by the MBTA, and most breeding birds in California are protected under the California Fish and Game Code (Section 3503).

### Mammals

**Salt marsh harvest mouse.** Salt marsh harvest mouse is listed as endangered under both FESA and CESA, and is a state fully protected species. Salt marsh harvest mouse are small, native rodents that are endemic to the salt marshes and adjacent diked wetlands of San Francisco Bay. Salt marsh harvest mice are listed as federally and state endangered species. This species is a California fully protected species. Suitable habitat for salt marsh harvest mouse is present in the tidal and diked marshes in the study area. It is anticipated salt marsh harvest mouse will occupy suitable pickleweed and marsh habitats within the study area.

The salt marsh harvest mouse is endemic to the marshes which border San Francisco, San Pablo, and Suisun Bays. There are two subspecies of salt marsh harvest mouse: the northern subspecies (*Reithrodontomys raviventris halicoetes*) is found in the Marin Peninsula and San Pablo and Suisun Bays (Shellhammer and Barthman-Thompson 2015). The southern subspecies (*R. r. raviventris*) lives in the marshes of Corte Madera, Richmond and South San Francisco Bay (Shellhammer and Barthman-Thompson 2015). Occurrence of both subspecies within this small range is highly fragmented.

The primary habitat of the salt marsh harvest mouse is the middle to upper zone of salt and brackish marshes. The salt marsh harvest mouse is dependent on dense vegetation cover, usually in the form of pickleweed (*Salicornia pacifica*, the dominant salt marsh vegetation in the Bay) and other salt-dependent or salt-tolerant vegetation. Optimal salt marsh harvest mouse habitat has dense vegetative cover with a high percentage cover of pickleweed, and has contiguous dense and tall cover in which the mice can escape extreme water levels without excessive exposure to predation. Salt marsh harvest mouse may also move into grasslands adjacent to marshes during extreme high tides if dense cover is present. The mouse is largely herbivorous with pickleweed known to be its primary food source. Loss of habitat due to the diking and filling of wetlands has been the major factor contributing to the decline of the salt marsh harvest mouse.

Trapping studies conducted in 1990 for the USACE resulted in the capture of 14 salt marsh harvest mice in Tiscornia Marsh and 15 in the adjacent diked wetland in Pickleweed Park (Flannery and Bias 1990 as reported in USACE 1992). No other records of recent captures or trapping efforts in the area have been found; however, based on habitat suitability, resource agencies would likely assume the presence of this species for the purposes of Project environmental compliance. The salt marsh harvest mouse has a high potential to occur within the tidal marsh and diked marsh in the study area.

**Salt marsh wandering shrew.** The salt marsh wandering shrew (*Sorex vagrans halicoetes*) is a species of special concern and occurs within the central and south San Francisco Bay. It occurs in salt marsh communities along the southern parts of San Francisco Bay. In general, salt marsh shrews prefer areas of salt marsh with dense cover and mid to high marsh habitat about 6 to 8 feet above sea level, which provide adequate cover and nesting places along with plentiful supply of invertebrates (CDFG 1998).

The closest CNDDB occurrence was observed 6 miles east of the study area in salt marsh along the Richmond shoreline in 1985. The study area provides fairly isolated salt marsh habitat, and

winter flooding and high tides remove vital suitable habitat for this species in winter and spring within the study area, creating marginally suitable habitat for this species. This species could occur in the study area, given the geographical range of the species, and marginally suitable habitat.

**Pacific harbor seal.** Pacific harbor seal (*Phoca vitulina richardsi*) is a permanent resident in the San Francisco Bay and is routinely seen in waters near the Project site. Harbor seals are protected under the Marine Mammal Protection Act. They have been observed as far upstream in the Delta and Sacramento River as the City of Sacramento, although their use of the habitat north of Suisun Bay is irregular (Goals Project 2000).

The closest location to the Project site where harbor seals are known to haul out year-round is on Castro Rocks. Castro Rocks comprise several outcroppings between Castro Point and Red Rock Island immediately south of the Richmond-San Rafael Bridge. Individual seals may occasionally haul out farther to the west and southwest of the main haul-out site, depending on space availability and conditions at the main haul-out area. Harbor seals feed in the deepest waters of the Bay, with the region from the Golden Gate Bridge to Treasure Island and south to the San Mateo Bridge being the principal feeding sites (Kopec and Harvey 1995). Harbor seals feed on a variety of fish, such as perch, gobies, herring, and sculpin.

**California sea lion.** The California sea lion (Zalophus californianus) lives in the San Francisco Bay-Delta and is protected by the Marine Mammal Protection Act. A common, abundant marine mammal, they are found throughout the West Coast, generally within 10 miles of shore. They breed in Southern California and the Channel Islands, after which they migrate up the Pacific coast to the Bay. They haul out on offshore rocks, sandy beaches, and onto floating docks, wharfs, vessels, and other man-made structures in the Bay and coastal waters. California sea lions feed on a wide variety of seafood, mainly squid and fish and sometimes even clams. Commonly eaten fish and squid species include salmon, hake, Pacific whiting, anchovies, herring, schooling fish, rockfish, lamprey, dog fish, and market squid. California sea lions may occasionally haul out at Castro Rock and thus may forage in the waters adjacent to the Project site.

**Harbor porpoise.** Harbor porpoise (Phocoena phocoena) inhabit northern temperate and subarctic coastal and offshore waters. In the North Pacific, they are found from Japan north to the Chukchi Sea and from Monterey Bay, California to the Beaufort Sea. The primary food for harbor porpoises is fish and squid. They are most often observed in bays, estuaries, harbors, and fjords less than 650 feet deep, like the central San Francisco Bay and are unlikely to occur north of Richmond-San Rafael and are thus unlikely to occur within the aquatic portion of the study area.

### Managed U.S. Fisheries Species

Under the Magnuson-Stevens Act (see *Regulatory Setting* for a description), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-297), the National Marine Fisheries Service (NMFS), Fishery Management Councils, and federal agencies are required to cooperatively protect essential fish habitat for commercially important fish species such as Pacific coast groundfish, salmon, and coastal pelagic fish and squid. As defined by the U.S. Congress, Essential Fish Habitat includes “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” Fish species that are found in the study area and are protected by federal Fishery

Management Plans prepared by regional Fishery Management Councils under the Magnuson-Stevens Act are listed in **Table 3.4-2**. All of the aquatic habitat within the study area is identified as Essential Fish Habitat for fish identified in the Pacific coast groundfish, salmon, and coastal pelagic fisheries management plans under the Magnuson-Stevens Act.

**TABLE 3.4-2**
**FISH MANAGED UNDER THE MAGNUSON-STEVENS ACT**

| Fisheries Management Plan | Species, Common Name | Species, Scientific Name | Life Stage[a] | Abundance |
|---|---|---|---|---|
| Coastal Pelagic | Northern anchovy | *Engraulis mordax* | J, A | Abundant |
| | Pacific sardine | *Sardinops japonicus* | J, A | Present |
| | Pacific herring | *Clupea pallasii* | E, J, A | Present |
| | Jacksmelt | *Atherinopsis californiensis* | J, A | Present |
| | Night smelt | *Spirinchus starksi* | J, A | Present |
| | Topsmelt | *Atherinops affinis* | J, A | Present |
| | Surf smelt | *Hypomesus pretiosus* | J, A | Present |
| Pacific Groundfish | Big skate | *Raja binoculata* | J, A | Present |
| | Leopard shark | *Triakis semifasciata* | J, A | Present |
| | Spiny dogfish | *Squalus suckleyi* | J, A | Present |
| | Lingcod | *Ophiodon elongates* | J, A | Present |
| | Brown rockfish | *Sebastes auriculatus* | J | Present |
| | Bocaccio | *Sebastes paucispinis* | J | Present |
| | English sole | *Parophrys vetulus* | J, A | Present |
| | Curlfin sole | *Pleuronichthys decurrens* | J, A | Present |
| | Pacific sanddab | *Citharichthys sordidus* | J, A | Present |
| | Sand sole | *Psettichthys melanostictus* | J, A | Present |
| Pacific Coast Salmon | Chinook salmon | *Oncorhynchus tshawytscha* | J, A | Seasonally Present |

NOTES:

a. A = Adult; J = Juvenile; E = Egg.

SOURCES: PFMC (2019, 2020, 2021). CDFW IEP unpublished midwater trawl data (2018) 2017.

## Sensitive Natural Communities

Natural communities are assemblages of plant species that occur together in the same area and are defined by species composition and relative abundance. Sensitive natural communities are designated by various resource agencies, such as CDFW, or in local policies and regulations, and are generally considered to have important functions or values for wildlife and/or are recognized as declining in extent or distribution, and are considered threatened enough to warrant some level of protection. CDFW tracks communities it believes to be of conservation concern through its *California Sensitive Natural Community List* (CDFW 2019a, Sawyer et al. 2009).

The diked marsh and tidal marsh habitat types, described in Section 3.4.1 above and shown on Figure 2-3, both contain sensitive natural communities. The diked marsh and mid-high tidal marsh zones are both sensitive natural communities because they are dominated by pickleweed which

corresponds to the Pickleweed Mat Alliance in the California Sensitive Natural Community List (CDFW 2019a, Sawyer et al. 2009). The low tidal marsh zone is dominated by California cordgrass, which corresponds to the California Cordgrass Marsh Alliance. Both the Pickleweed Mat Alliance and California Cordgrass Marsh Alliance have a State Rarity Ranking of S3.

### Habitat Areas of Particular Concern

Eelgrass (*Zostera marina*) is a native marine vascular plant found globally within soft-bottom bays and estuaries and is considered a Habitat Area of Particular Concern. Habitat Areas of Particular Concern are a subsets of Essential Fish Habitat that exhibit one or more of the following traits: rare, stressed by development, provide important ecological functions for federally managed species, or are especially vulnerable to anthropogenic degradation. Eelgrass has been afforded special management considerations by CDFW, USFWS, NMFS, U.S. Environmental Protection Agency (EPA), and the San Francisco Bay Conservation and Development Commission. The species is found from middle Baja California and the Sea of Cortez to northern Alaska along the west coast of North America, and is common in healthy, shallow bays and estuaries. The depth to which this species can grow is a function of light penetration. At greater depths, light is reduced to a level below which photosynthesis is unable to meet the metabolic demands of the plant to sustain net growth.

In the San Francisco Bay-Delta, eelgrass beds occur on soft bottom substrate in shallow areas (typically less than -1.5-meter depth at mean low tide level). Eelgrass beds are extremely dynamic, expanding and contracting seasonally and annually depending on the quality of the site. Consequently, they serve as an indicator community for the overall health of an estuary. Eelgrass plays many roles within the estuary system. It clarifies water through sediment trapping and habitat stabilization. It also provides benefits of nutrient transformation and water oxygenation. Eelgrass serves as a primary producer in a detrital-based food-web and is further directly grazed upon by invertebrates, fish, and birds. It supports epiphytic plants and animals that, in turn, are grazed upon by other invertebrates, larval and juvenile fish, and birds. Eelgrass is a nursery area for many commercially and recreationally important finfish and shellfish species, including those that are resident within bays and estuaries, nearly all of the anadromous fish species found along the Pacific coast, and oceanic species, which enter the estuaries to breed or spawn. Besides providing important habitat for fish, eelgrass habitat is also considered an important resource supporting migratory birds during critical life stages, including migratory periods.

Comprehensive eelgrass surveys of the San Francisco Bay-Delta have been conducted in 1987, 2003, 2009, and 2014. The 1987 survey reported a total of 316 acres of eelgrass beds in San Francisco Bay-Delta (Merkel & Associates 2014). The 2009 and 2014 surveys, which employed both high-resolution acoustic mapping and helicopter aerial imagery, reported 3,707 and 2,790 acres of eelgrass beds, respectively present in San Francisco Bay-Delta. No eelgrass beds are present within the aquatic portions of the study area; however, a handful of small (< 0.1 acre) patches of eelgrass were mapped offshore of Bay Point Lagoon south of the study area in 2014. The beds are located beyond potential impact from Project activities.

### Critical Habitat

The aquatic portions of the Project site are designated as critical habitat by NMFS for a handful of special-status fish species. Critical habitat is habitat needed to support the recovery of listed species. Importantly, critical habitat for spring and winter-run Chinook salmon is not found with the study area.

**Central Valley Steelhead.** Critical habitat for the Central Valley steelhead is designated throughout accessible stream habitat within the Central Valley (NMFS 2005). The primary migration corridor, through Raccoon Straight north of Angel Island, is also designated as critical habitat for this DPS. Due to their importance in supporting the movement of this DPS between the Pacific Ocean and spawning and rearing habitat in the Central Valley, the waters of the study area are also designated as critical habitat.

**Central California Coast Steelhead.** Critical habitat includes all natal spawning and rearing waters, migration corridors, and estuarine areas that serve as rearing areas accessible to listed steelhead in coastal river basins, from the Russian River to Aptos Creek (inclusive), and the drainages of San Francisco and San Pablo Bays. Also included are adjacent riparian zones, all waters of San Pablo Bay west of the Carquinez Bridge, and all waters of San Francisco Bay to the Golden Gate Bridge (USFWS 2000). Critical habitat is designated within the aquatic portions of the study area.

**Green Sturgeon.** The critical habitat designation for green sturgeon includes the coastal marine habitat off California from Monterey Bay, north and east to include waters in the Strait of Juan de Fuca, Washington, and extends from mean higher high water to a depth of 358 feet (109 meters) (74 FR 52300). Within San Francisco Bay, critical habitat includes the Sacramento River, the Sacramento-San Joaquin Delta, and Suisun, San Pablo, and all of San Francisco Bay. This designation includes the aquatic portion of the study area.

## 3.4.2 Regulatory Setting

This subsection briefly describes federal, state, and local regulations, permits, and policies pertaining to biological resources and wetlands as they apply to the Proposed Project.

## Federal Regulations

### *Federal Endangered Species Act*

The federal Endangered Species Act (FESA) protects listed plant and wildlife species from harm or "take," which is broadly defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Take can also include habitat modification or degradation that directly results in the death or injury of a listed wildlife species. An activity can be defined as take even if it is unintentional or accidental. Listed plant species are provided less protection than listed wildlife species. Listed plant species are legally protected from take under the FESA only if they occur on federal lands or if the Project requires a federal action, such as a Section 404 permit from the USACE. The USFWS has jurisdiction over wildlife species that are federally listed as threatened and endangered under the FESA, while NMFS has

jurisdiction over marine species and anadromous fish that are federally listed as threatened and endangered. Species that are candidates for listing under the FESA are not granted these protections under the FESA. Consultation with either the USFWS or NMFS would be required for the Project since the USACE will need to issue a permit for the Project. During consultation, the potential for take would be determined and, if take is expected to occur, the necessary conditions to allow the issuance of an incidental take permit would be imposed.

Areas of habitat considered essential to the conservation of a listed endangered or threatened species may be designated as critical habitat, which is protected under FESA. There is no critical habitat designated in the study area.

### *Federal Migratory Bird Treaty Act*

The MBTA is the domestic law that affirms and implements a commitment by the United States to four international conventions (with Canada, Mexico, Japan, and Russia) for the protection of a shared migratory bird resource. Unless and except as permitted by regulations, the MBTA encompasses whole birds, parts of birds, and bird nests and eggs. The FESA defines take as "…harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect any threatened or endangered species." Harm may include significant habitat modification where it actually kills or injures a listed species through impairment of essential behavior (e.g., nesting or reproduction). This would include the protection of nests for all species that are on the List of Migratory Birds, most recently updated in the Federal Register (50 CFR 10.13) in 2013.

All native bird species occurring in the study area are protected by the MBTA and could be affected by the proposed project.

### *Federal Clean Water Act*

Wetlands are ecologically complex habitats that support a variety of both plant and animal life. The federal government defines and regulates other waters, including wetlands, in Section 404 of the Clean Water Act. Wetlands are "*areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions*" (33 CFR § 328.3[c] and 40 CFR 230.3). Under normal circumstances, the federal definition of wetlands requires the presence of three identification parameters: wetland hydrology, hydric soils, and hydrophytic vegetation.

The regulations and policies of various federal agencies (e.g., USACE, EPA, and USFWS) mandate that the filling of wetlands be avoided unless it can be demonstrated that there is no practicable alternative to filling. The USACE has primary federal responsibility for administering regulations that concern waters and wetlands in the study area under the statutory authority of the Rivers and Harbors Appropriation Act (Sections 9 and 10) and the Clean Water Act (Section 404).

Pursuant to Section 10 of the Rivers and Harbors Appropriation Act of 1899 (33 USC § 403), the USACE regulates the construction of structures in, over, or under, excavation of material from, or deposition of material into navigable waters. In tidal areas, the limit of navigable water under Section

10 is the elevation of the mean high-water mark;[7] in nontidal waters, it is the ordinary high-water mark.[8] Larger streams, rivers, lakes, bays, and oceans are examples of navigable waters regulated under Section 10 of the Rivers and Harbors Appropriation Act. The act prohibits the unauthorized obstruction or alteration of any navigable water (33 USC § 403). Navigable waters under the act are those "*subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce*" (33 CFR § 329.4). Typical activities requiring Section 10 permits are construction of piers, wharves, bulkheads, marinas, ramps, floats, intake structures, cable or pipeline crossings, and dredging and excavation.

Section 404 of the federal Clean Water Act (33 USC 1251 et seq. [1972]) prohibits the discharge of dredged or fill material into waters of the United States, including wetlands, without a permit from USACE. The agency's jurisdiction in tidal waters under Section 404 extends to the high-tide line or high-tide mark, simply indicating a point on the shore where water reaches a peak height at some point each year.

The Clean Water Act prohibits the discharge of any pollutant without a permit. Implicit in the act's definition of *pollutant* is the inclusion of dredged or fill material regulated by Section 404 (33 USC § 1362). The discharge of dredged or fill material typically means adding into waters of the United States materials such as concrete, dirt, rock, pilings, or side-cast material for the purpose of replacing an aquatic area with dry land or raising the elevation of an aquatic area. Activities typically regulated under Section 404 include the use of construction equipment such as bulldozers, and the leveling or grading of sites where jurisdictional waters occur.

### *Marine Mammal Protection Act*

The Marine Mammal Protection Act of 1972, as amended, establishes a federal responsibility for the protection and conservation of marine mammal species by prohibiting the harassment, hunting, capture, or killing of any marine mammal. The primary authority for implementing the act belongs to the USFWS and NMFS.

### *Magnuson-Stevens Fishery Conservation and Management Act*

The Magnuson-Stevens Act (16 USC 1801–1884) of 1976, as amended in 1996 and reauthorized in 2007, applies to fisheries resources and fishing activities in federal waters. Federal waters extend to 200 miles offshore. Conservation and management of U.S. fisheries, development of domestic fisheries, and phasing out of foreign fishing activities are the main objectives of the legislation.

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7 The mean high-water mark, with respect to ocean and coastal waters, is defined as the line on the shore established by the average of all high tides. It is established by survey based on available tidal data (preferably averaged over a period of 18.6 years because of the variations in tide). In the absence of such data, less precise methods to determine the mean high water mark are used, such as physical markings, lines of vegetation or comparison of the area in question with an area having similar physical characteristics for which tidal data are readily available.

8 The ordinary high-water mark is defined in 33 CFR § 328.3[c][7] as "that line on the shore established by the fluctuations of water and indicated by physical characteristics such as a clear, natural line impressed on the bank, shelving, changes in the character of the soil, destruction of terrestrial vegetation, the presence of litter or debris, or other appropriate means that consider the characteristics of the surrounding area."

The Magnuson-Stevens Act defines Essential Fish Habitat as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. The act, as amended through 2007, sets forth a number of new mandates for NMFS, regional Fishery Management Councils, and federal action agencies to identify Essential Fish Habitat and to protect important marine and anadromous fish habitat. The Magnuson-Stevens Act provided NMFS with legislative authority to regulate fisheries in the United States in the area between 3 miles and 200 miles offshore, and established eight regional Fishery Management Councils that manage the harvest of the fish and shellfish resources in these waters. The councils, with assistance from NMFS, are required to develop and implement Fishery Management Plans, which include the delineation of Essential Fish Habitat for all managed species. A Fisheries Management Plan is a plan to achieve specified management goals for a fishery and is comprised of data, analyses, and management measures. Essential Fish Habitat that is identified in a management plan applies to all fish species managed by that plan, regardless of whether the species is a protected species or not. Federal agency actions that fund, permit, or carry out activities that may adversely affect Essential Fish Habitat are required under Section 305(b), in conjunction with required Section 7 consultation under the FESA, to consult with NMFS regarding potential adverse effects of their actions on Essential Fish Habitat and to respond in writing to NMFS' recommendations.

The waters of San Francisco Bay are designated as Essential Fish Habitat for fish managed under three Fisheries Management Plans. These include species of commercially important fish and sharks managed in the Pacific Coast Groundfish and Coastal Pelagic Species Management Plans. In addition, the Pacific Coast Salmon Management Plan, which includes Chinook salmon, identifies all of the San Francisco Bay as Essential Fish Habitat (USACE 2009).

## State Regulations

### *California Endangered Species Act*

Under the California Endangered Species Act (CESA), CDFW has the responsibility for maintaining a list of threatened and endangered species (California Fish and Game Code Section 2070). CDFW also maintains a list of candidate species, which are species formally under review for addition to either the list of endangered species or the list of threatened species.

The CESA prohibits the take of plant and animal species that the California Fish and Game Commission has designated as either threatened or endangered in California. "Take" in the context of this regulation means to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill a listed species (California Fish and Game Code Section 86). The take prohibitions also apply to candidates for listing under the CESA. However, Section 2081 of the act allows CDFW to issue permits for the minor and incidental take of species by an individual or permitted activity listed under the act. Unlike the FESA, species that are candidates for state listing are granted the same protections as listed species under the CESA.

In accordance with the requirements of the CESA, an agency reviewing a project within its jurisdiction must determine whether any state-listed endangered or threatened species could be present in the project area. The agency also must determine whether the project could have a potentially significant impact on such species. In addition, CDFW encourages informal

consultation on any project that could affect a candidate species. During consultation, the potential for take would be determined and, if take is expected to occur, the terms of an incidental take permit would be developed.

### *California Fish and Game Code Sections 1602, 3503, 3511, 4150, 4700, 5050, and 5515*

Under Sections 1600–1616 of the California Fish and Game Code, the CDFW regulates activities that would substantially divert, obstruct the natural flow of, or substantially change rivers, streams, and lakes through the issuance of a Lake or Streambed Alteration Agreement (LSAA). The jurisdictional limits of the CDFW are defined in Section 1602 of the Fish and Game Code as the "bed, channel, or bank of any river, stream, or lake", although jurisdiction is often interpreted to include adjacent riparian vegetation as well. Activities that would "deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake" are prohibited by the CDFW unless an LSAA is issued. Any work within channels with a clear bed and banks, such as San Rafael Creek, falls under CDFW jurisdiction and requires an LSAA.

Under Section 3503 of the California Fish and Game Code, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Section 3503.3 of the California Fish and Game Code prohibits the take, possession, or destruction of any raptor (birds of prey) in the orders Falconiformes (hawks) or Strigiformes (owls), or of their nests and eggs. Any loss of fertile eggs or nesting raptors, or any activities resulting in nest abandonment, would constitute a significant impact.

The State Fish and Game Code Section 4150 states that all non-game mammals or parts thereof may not be taken or possessed except as otherwise provided in the code or in accordance with regulations adopted by the commission. This section applies to all bat species.

CDFW Fully Protected Species may not be taken or possessed at any time without a permit from CDFW (Section 3511 Birds, Section 4700 Mammals, Section 5050 Reptiles and Amphibians, and Section 5515 Fish).

### *State Regulation of Wetlands and Other Waters*

California's authority in regulating activities in wetlands and waters in the study area resides primarily with the State Water Resources Control Board. The State Water Board, acting through the San Francisco Bay Regional Water Quality Control Board, must certify that a USACE permit action meets state water quality objectives (Clean Water Act Section 401). Any condition of water quality certification is then incorporated into the USACE Section 404 permit authorized for the project.

The State Water Board and Regional Water Board also have jurisdiction over Waters of the State under the Porter-Cologne Water Quality Control Act. They evaluate proposed actions for consistency with the Regional Water Board's Basin Plan, and authorize impacts on Waters of the

State by issuing Waste Discharge Requirements or, in some cases, a waiver of Waste Discharge Requirements.

The San Francisco Bay Conservation and Development Commission has jurisdiction over coastal activities occurring within and around San Francisco Bay and Suisun Marsh. The commission was created by the McAteer-Petris Act (California Government Code Sections 66600−66694). The commission regulates fill, extraction of materials, and substantial change in the use of land, water, and structures in San Francisco Bay and development within 100 feet of the Bay including ensuring the maximum feasible public access consistent with the project. The commission has jurisdiction over all areas of San Francisco Bay that are subject to tidal action, including subtidal areas, intertidal areas, and tidal marsh areas that are between mean high tide and 5 feet above mean sea level.

On April 6, 2021, the State Water Resources Control Board adopted a resolution to confirm that the "State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State" is in effect as state policy for water quality control.

#### California Native Plant Protection Act

State listing of plant species began in 1977 with the passage of the California Native Plant Protection Act (NPPA), which directed CDFW to carry out the legislature's intent to "preserve, protect, and enhance endangered plants in this state." The NPPA gave the California Fish and Game Commission the power to designate native plants as endangered or rare and to require permits for collecting, transporting, or selling such plants. The CESA expanded upon the original NPPA and enhanced legal protection for plants. The CESA established threatened and endangered species categories, and grandfathered all rare animals—but not rare plants—into the act as threatened species. Thus, there are three listing categories for plants in California: rare, threatened, and endangered.

### *Marine Life Management Act*

Within California, most of the legislative authority over fisheries management is enacted within the Marine Life Management Act. This law directs CDFW and the Fish and Game Commission to issue sport and commercial harvesting licenses, as well as license aquaculture operations. CDFW, through the commission, is the state's lead biological resource agency and is responsible for enforcement of the state's endangered species regulations and the protection and management of all state biological resources.

## Local Plans and Policies

The City of San Rafael General Plan 2040 and the San Rafael Municipal Code include a number of policies related to wetland and creek protection and mitigation, to address potential loss of wetlands that may be caused by development; however, those policies do not directly pertain to this Project, which is a wetland and habitat restoration Project. Program element C-1.1C: Tiscornia March Restoration, guides the City to support restoration plans for Tiscornia Marsh (this Project); while Municipal Code Section 14.13.010 encourages restoration of wetland sites.

### *City of San Rafael Municipal Code*

The City of San Rafael provides for the protection of trees in the Municipal Code (Code) Sections 11.12 and 14.25. Section 11.12 outlines permit requirements for any tree-related work (removal, planting, or pruning) and Section 14.25 provides the framework for the Environmental and Design Review permitting process, which includes a section on landscaping design and street tree planting guidelines. The study area may support trees considered protected in accordance with the San Rafael Municipal Code.

**11.12.010 - Authority of public works department.** The public works department shall have supervision over all matters relating to trees now planted or hereafter to be planted in, upon or along the public streets, sidewalks and walkways within the city. Whenever, by the terms of this chapter, an approval is required or a permit is required for, or a decision made with respect to the performance of any act prior thereto, the approval or permit shall be secured from, and the decisions shall be made by, the public works department.

**11.12.030 - Approval and permit.** No tree shall be planted in, upon or along any public street, sidewalk or walkway in the city until such tree shall have been first approved, and the place where it is to be planted designated, and a permit granted.

**11.12.040 - Placement of trees.** Trees shall not be planted along sidewalks less than thirty feet apart irrespective of the size of the lot, except as may be authorized by any permit therefor, and as much further apart as may be directed.

**11.12.050 - Cutting, pruning, breaking, injuring, removing, spraying.** No person shall, without a written permit issued pursuant to this chapter, cut, prune, break, injure or remove any living tree in, upon or along any public street, sidewalk or walkway in the city or cut, disturb, or interfere in any way with the roots of any tree in, upon or along any street, sidewalk or walkway, or spray with any chemical or insecticide any tree in, upon or along any public street, sidewalk or walkway, or place any sign, poster, or other fixture on any tree or tree guard, or injure, misuse or remove any device placed to protect any tree in, upon or along any public street, sidewalk, or walkway in the city.

Whenever any tree shall, under the authority of a permit issued therefore under this chapter, be cut down or removed in or from any sidewalk area, its butt and roots shall be dug up and removed, or cut level with the ground, as directed by the public works department.

**11.12.060 - Protection of trees during construction.** In the erection or repair of any building or structure, the owner thereof, or the contractor, if the work is being done by contract, shall place such guards around all nearby trees in, upon or along the public streets, sidewalks and walkways within the city as shall prevent injury to them.

**11.12.090 - Interference with tree work prohibited.** No person shall prevent, delay or interfere in the planting, pruning, spraying or removing of any tree located in, upon or along a public street, sidewalk or walkway, or in the removal of stone, cement or other substance about the trunk of any such tree, whether the said work be performed by employees of the city or by any independent contractor, or his employees, engaged by the city to perform such work.

No person shall place within two feet of any existing tree, any paving material, weed killing material or other like substance.

**14.25.050 – Review criteria. Part G - Landscape Design.** The natural landscape should be preserved in its natural state, insofar as practicable, by minimizing grading, and tree and rock removal. The landscaping shall be designed as an integral enhancement of the site, sensitive to natural site features…

4. Street Trees and Landscaping. Street trees shall be shown on plans submitted for a project within the downtown area, and shall be provided and protected in accordance with the city street tree planting guidelines and recommendations of the city arborist. Street trees and landscaping should be consistent with the following:

a. Provide smaller scale, seasonal color and street trees for pedestrian-oriented streets.

b. Provide high-canopy traffic-tolerant trees and landscaped setbacks for primary vehicular circulation streets.

c. Existing mature trees proposed to be removed as part of a project should be replaced with an equivalent number, size and alternate species.

d. Trees proposed to remain shall be protected during construction.

e. All trees shall be installed, protected and pruned in accord with accepted arboricultural standards and practices.

## 3.4.3 Impacts and Mitigation Measures

### Significance Criteria

The criteria used to determine the significance of impacts related to biological resources are based on Appendix G of the CEQA Guidelines. The Proposed Project would have a significant impact if it would:

(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 CDFW or USFWS.

(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 CDFW or USFWS.

(c) Have a substantial adverse effect on state or federally protected wetlands (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.

## Approach to Analysis

Impacts on biological resources are identified and evaluated based on the following: relevant CEQA and local standards, policies, and guidelines; the likelihood that special-status species, sensitive habitats, wetlands and waters, and wildlife corridors are present within the study area; and the potential effects that project construction, operation, and maintenance might have on these resources. The analysis identifies both direct impacts on individual species and impacts resulting from habitat modification, and considers the longevity (short term and temporary or long term and/or permanent) of the potential impact on the biological resource. Special-status resources that were determined to have a low or no potential to occur in the study area are not considered in the impact analysis.

## Impact Summary

**Table 3.4-3** provides a summary of biological resource impacts and by implementation phase (construction and operations).

**TABLE 3.4-3**
**SUMMARY OF BIOLOGICAL RESOURCES IMPACTS**

| Impact Statement | Construction | Operation |
|---|---|---|
| **Impact 3.4-1:** Construction or operation of the Project could have a substantial effect on special-status birds, common nesting migratory birds, or raptors in the study area. | LTSM | LTS |
| **Impact 3.4-2:** The Project could have substantial adverse effects on salt marsh harvest mouse and salt marsh wandering shrew. | LTSM | LTS |
| **Impact 3.4-3.** Construction or operation of the Project could have a substantial effect on special-status plants. | LTSM | LTS |
| **Impact 3.4-4.** The Proposed Project could have a substantial adverse effect, either directly or through habitat modification, on marine species identified as a candidate, sensitive, or special-status species in local or regional plans, policies or regulations, or by the CDFW, USFWS, or NOAA. | LTSM | LTS |
| **Impact 3.4-5:** The Project could have substantial adverse effects on jurisdictional wetlands, other Waters of the United States and Waters of the State. | LTS | LTS |
| **Impact 3.4-6:** The Project could 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. | LTSM | LTS |
| **Impact 3.4-7:** The Project could conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance and could conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. | LTS | NI |
| **Impact 3.4-8:** The Project could 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 CDFW, USFWS, or NMFS. | LTS | LTS |
| **Impact 3.4-9:** Cumulative loss of sensitive biological resources during construction and operations. | LTSM | LTSM |

NOTES:

LTS = Less than significant
LTSM = Less than significant with mitigation
NI = No Impact

## Impact Analysis

**Impact 3.4-1: Construction or operation of the Project could have a substantial effect on special-status birds, common nesting migratory birds, or raptors in the study area. (*Less than Significant with Mitigation*)**

### Construction Impacts

#### California Black Rail and California Ridgway's Rail

Suitable ground-nesting and foraging habitat for California black rail and California Ridgway's rail is found within tidal marsh portions of the study area. California Ridgway's rails were detected in Tiscornia Marsh in years prior to 2019; however, they were not detected during surveys in 2019 or 2020 (OEI 2020, 2021). California black rail has not been detected during rail surveys within Tiscornia Marsh (OEI 2011–2021). Construction activities that could impact nesting and foraging rails include work in or near suitable rail habitat such as vegetation clearing (in limited areas), use of heavy equipment and dump trucks, placement of temporary fill, and the presence of workers and vehicles.

Impacts could occur on rails during construction during both the breeding and non-breeding seasons. Impacts during the non-breeding season are not considered significant, primarily due to the birds' mobility and ability to access other high-quality foraging habitat in other tidal marsh channels within 3 miles of Tiscornia Marsh. However, equipment staging and Project construction could render the site temporarily unsuitable for breeding rails due to the noise, vibration, and increased activity levels associated with grubbing, earth moving, heavy equipment operation, and increased human presence even when the nest itself is unaffected. These activities could cause the direct destruction of an active nest, or cause birds that have established a nest prior to the start of construction to change their behavior or even abandon an active nest, putting eggs and nestlings at risk for mortality. This would be considered a **significant impact**.

In summary, temporary construction-related impacts could result in significant impacts on California black rail and California Ridgway's rail. However, implementation of **Mitigation Measures 3.4-1 and 3.4-2** would reduce potential construction-related impacts on California Ridgway's rail and California black rail to less-than-significant by providing environmental training to construction personnel, providing general protection measures, avoiding disturbance to rail nesting habitat, conducting pre-construction protocol surveys to identify any active nests, and stopping work if Project activities disturb nesting rails. With implementation of Mitigation Measures 3.4-1 and 3.4-2, construction-related impacts would be **less than significant**.

#### Northern Harrier, Salt Marsh Common Yellowthroat, San Pablo Song Sparrow, and Nesting Birds Protected by the Migratory Bird Treaty Act

Because special-status bird species and birds protected by the MBTA could nest in trees, shrubs, grasses, emergent vegetation, marsh vegetation, or even on bare ground, all terrestrial parts of the study area are considered potential nesting habitat. Therefore, active nests could be encountered during restoration-related construction activities that could include clearing and grubbing vegetation, excavating tidal channels, use of heavy equipment and dump trucks, and presence of workers and vehicles associated with all aspects of construction.

Impacts could occur on resident and migratory species from construction during both the breeding and non-breeding seasons. Impacts during the non-breeding season are not considered significant, primarily due to the absence of active nests and the birds' mobility and ability to access other high-quality foraging habitat in the region. However, equipment staging and Project construction could render the site temporarily unsuitable for breeding birds due to the noise, vibration, and increased activity levels associated with grubbing, earth moving, heavy equipment operation, and increased human presence even when the nest itself is unaffected. These activities could cause the direct destruction of an active nest, or cause birds that have established a nest prior to the start of construction to change their behavior or even abandon an active nest, putting eggs and nestlings at risk for mortality. This would be considered a **significant impact**.

Implementation of **Mitigation Measures 3.4-1 and 3.4-3** would ensure that the Project would have a **less than significant impact** on nesting birds by providing environmental training to construction personnel, providing general protection measures, identifying active nests, and establishing no-work buffer zones around active nests identified on or near the Project site.

## Operational Impacts

### Special-status and Common Migratory Birds and Raptors

The creation of foraging and nesting habitat within the Project site would improve conditions for special-status and common migratory birds and raptors. Minimal operations and maintenance activities are anticipated, including ongoing vegetation management, weeding, and debris removal, similar to existing conditions.

Breeding birds could be directly or indirectly impacted by ongoing maintenance activities, including inspection for erosion or rodent damage along the levee tops and slopes, and levee maintenance activities such as mowing and weed control and repair of erosion sites. However, impacts associated with ongoing monitoring and maintenance are expected to be of short duration (i.e., on the order of hours to days) and infrequent, and are a continuation of comparable operations and maintenance activities currently implemented by the City on existing levees. The impacts on California black rail, California Ridgway's rail, and all special-status and protected birds associated with ongoing operations and maintenance are considered **less than significant** because activities would be limited in duration and frequency, and are a continuation of comparable current operations and maintenance activities.

## Mitigation Measures

**Mitigation Measure 3.4-1: General Construction-related Mitigation Measures**

- A qualified biologist (4-year college degree in biology or related field and demonstrated experience with the species of concern) shall provide Worker Environmental Awareness Training (WEAT) to field management and construction personnel. Communication efforts and training shall take place during pre-construction meetings so that construction personnel are aware of their responsibilities and the importance of compliance. WEAT shall identify the types of sensitive resources located in the study area and the measures required to avoid impacts on these resources. Materials covered in the training program shall include environmental rules and regulations for the specific Project and

requirements for limiting activities to the construction right-of-way and avoiding demarcated sensitive resource areas.

- If new construction personnel are added to the Project, the contractor shall ensure the new personnel receive WEAT before starting work. A sign-in sheet of those contractor individuals who have received the training shall be maintained by the Project proponent. A representative shall be appointed during the WEAT to be the contact for any employee or contractor who might inadvertently kill or injure a listed species or who finds a dead, injured, or entrapped individual.
- All vehicle operators shall limit speed to 15 miles per hour (mph) within the Project site.
- No erosion control materials shall contain any plastic or monofilament netting.

To avoid attracting predators, all food-related trash items shall be bagged and removed daily.

**Mitigation Measure 3.4-2: Avoid and Minimize Impacts on California Black Rail and California Ridgway's Rail**

- To minimize or avoid the loss of individual California black rail and California Ridgway's rail, construction activities, including vegetation management activities requiring heavy equipment, adjacent to the tidal marsh areas (within 500 feet [150 meters] or a distance determined in coordination with the USFWS or CDFW, shall be avoided during the breeding season from February 1 through August 31.
- If areas within or adjacent to rail habitat cannot be avoided during the breeding season, protocol-level surveys shall be conducted to determine rail nesting locations. The surveys shall focus on potential habitat that could be disturbed by construction activities during the breeding season to ensure that rails are not breeding in these locations.

  Survey methods for rails shall follow the *Site-Specific Protocol for Monitoring Marsh Birds*, which was developed for use by USFWS and partners to improve bay-wide monitoring accuracy by standardizing surveys and increasing the ability to share data (Wood et al. 2017). Surveys are concentrated during the approximate period of peak detectability, January 15 to March 25, and are structured to efficiently sample an area in three rounds of surveys by broadcasting calls of target species during specific periods of each survey round. Call broadcasts increase the probability of detection compared to passive surveys when no call broadcasting is employed. This protocol has since been adopted by the Invasive Spartina Project (ISP) and Point Blue Conservation Science to survey California Ridgway's rails at sites throughout San Francisco Bay Estuary. The survey protocol for California Ridgway's rail is summarized below.

  – Previously used survey locations (points) should be used when available to maintain consistency with past survey results. Adjacent points should be at least 200 meters apart along transects in or adjacent to areas representative of the marsh. Points should be located to minimize disturbances to marsh vegetation. Up to eight points can be located on a transect.

  – At each transect, three surveys (rounds) are to be conducted, with the first round of surveys initiated between January 15 and February 6, the second round performed February 7 to February 28, and the third round March 1 to March 25. Surveys should be spaced at least 1 week apart, and the period between March 25 to April 15 can

be used to complete surveys delayed by logistical or weather issues. A FESA Section 10(a)(1)(A) permit is required to conduct active surveys.

  - Each point on a transect shall be surveyed for 10 minutes each round. A recording of calls available from the USFWS is broadcast at each point. The recording consists of 5 minutes of silence, followed by a 30-second recording of California Ridgway's rail vocalizations, followed by 30 seconds of silence, followed by a 30-second recording of California black rail, followed by 3.5 minutes of silence.

- If no breeding California black rail or California Ridgway's rail are detected during surveys, or if their breeding territories can be avoided by 500 feet (150 meters), then Project activities may proceed at that location.
- If protocol surveys determine that breeding California black rail and/or California Ridgway's rail are present in the project area, the following measures would apply to Project activities conducted during their breeding season (February 1- August 31):
  - Construction activities would not occur within 500 feet of a detected Ridgway's rail or black rail call center.
  - A USFWS- and CDFW-approved biologist shall be on site during construction activities occurring within 500 feet (150 meters) of any other suitable rail breeding habitat.
  - All other biologists that may need to access the tidal marsh outside of the active construction period or be on site during construction for activities beyond 500 feet from suitable rail breeding habitat, shall be trained in black rail and Ridgway's rail biology, identification, and vocalizations, and shall be familiar with both species of rail and their nests.
  - If a California black rail or California Ridgway's rail vocalizes or flushes within 10 meters, it is possible that a nest or young are nearby. If an alarmed bird or nest is detected, work shall be stopped, and workers shall leave the immediate area carefully and quickly. An alternate route shall be selected that avoids this area, and the location of the sighting shall be recorded to inform future activities in the area.
  - All construction crews working in the marsh during rail breeding season shall be trained and supervised by a USFWS- and CDFW-approved rail biologist.
  - If any activities shall be conducted during the rail breeding season in California black rail or California Ridgway's rail-occupied marshes, biologists shall have maps or global positioning system (GPS) locations of the most current occurrences on the site.

**Mitigation Measure 3.4-3: Nesting Bird Protection Measures**

The City shall require the Project sponsor to implement the following during construction of the Project:

- Removal of trees and scrub vegetation shall occur outside the bird nesting season (February 1 to August 31), to the extent feasible.
- If removal of trees and vegetation cannot be fully accomplished outside of the nesting season, a qualified biologist shall conduct pre-construction nesting surveys within 7

days prior to the start of such activities or after any construction breaks of 10 days or more. Surveys shall be performed for the study area and suitable habitat within 250 feet of the Project site to locate any active raptor (birds of prey) nests or rookeries.

- If active nests are located during the pre-construction bird nesting survey, the qualified biologist shall evaluate if the schedule of construction activities could affect the active nests and the following measures shall be implemented based on their determination:
  - If construction is not likely to affect the active nest, it may proceed without restriction; however, a biologist shall regularly monitor the nest to confirm there is no adverse effect and may revise their determination at any time during the nesting season. In this case, the following measure would apply.
  - If construction may affect the active nest, the biologist shall establish a no-disturbance buffer in coordination with CDFW. Typically, these buffer distances are 100 feet for passerines and 250 feet for raptors. These distances may be adjusted depending on the level of surrounding ambient activity (e.g., if the Project site is adjacent to a road or active trail) and if an obstruction, such as a building, is within line-of-sight between the nest and construction. For bird species that are federally and/or state-listed sensitive species (i.e., fully protected, endangered, threatened, species of special concern), a City representative or qualified biologist shall coordinate with the USFWS and/or CDFW regarding modifications to nest buffers, prohibiting construction within the buffer, or modifying construction.
  - Any birds that begin nesting within the Project area and survey buffers amid construction activities are assumed to be habituated to construction-related or similar noise and disturbance levels. A qualified biologist shall coordinate with the USFWS and/or CDFW and determine if no work exclusion zones shall be established around active nests in these cases.

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**Impact 3.4-2: The Project could have substantial adverse effects on salt marsh harvest mouse and salt marsh wandering shrew. (*Less than Significant with Mitigation*)**

Suitable habitat for salt marsh harvest mouse and salt marsh wandering shrew is found throughout the tidal marsh and diked marsh in the study area. Construction activities that could impact salt marsh harvest mouse and salt marsh wandering shrew include earthwork associated with constructing the levees and ecotone slope, excavating the new tidal channel, constructing the temporary access road across the marsh, and potentially, equipment staging. Levees and ecotone slope would be built in upland, transition zone, and marsh edge habitat. These habitats are used by salt marsh harvest mouse, and possibly salt marsh wandering shrew, especially as refugia during high tides.

Direct impacts that could occur on salt marsh harvest mouse and salt marsh wandering shrew include mortality due to crushing by vehicles, materials staging, heavy equipment, or human activity in suitable salt marsh harvest mouse/salt marsh wandering shrew habitat, or mutilation by mowers or other motorized equipment used for vegetation removal. Indirect impacts could occur if equipment staging, Project construction, or human activity render otherwise suitable habitat

temporarily unsuitable due to the lack of accessibility, noise, vibration, and increased activity levels associated with grubbing, earth moving, and heavy equipment operation. Any of these would be considered a significant impact.

Construction impacts on salt marsh harvest mouse and salt marsh wandering shrew would be potentially significant. However, implementation of **Mitigation Measures 3.4-1 and 3.4-4** would reduce potential construction and operations impacts on salt marsh harvest mouse and salt marsh wandering shrew to a less-than–significant level by providing environmental training to construction personnel, providing general protection measures, conducting pre-construction surveys, identification and avoidance of suitable habitat for the species, and where avoidance is not possible, using hand tools to clear vegetation. Further, with implementation of Mitigation Measure 3.4-4, suitable marsh habitat would be protected during work activities, exclusion fencing would separate suitable habitat from adjacent work areas, a biomonitor would be in place to stop work if the species is detected, and work during extreme high tides would be avoided. With implementation of Mitigation Measures 3.4-1 and 3.4-4, construction-related impacts would be **less than significant**.

### Operational/Long-term Impacts

Salt marsh harvest mouse and salt marsh wandering shrew could be directly or indirectly impacted by ongoing maintenance activities including inspection for erosion or rodent damage along the levee slopes, and levee maintenance activities such as mowing and weed control and repair of erosion sites. However, impacts associated with ongoing monitoring and maintenance are expected to be of short duration (i.e., on the order of hours to days) and infrequent, and are a continuation of comparable operations and maintenance activities currently implemented by the City on existing levees. The impacts on salt marsh harvest mouse and salt marsh wandering shrew associated with ongoing operations and maintenance are considered **less than significant** because activities would be limited in duration and frequency, are a continuation of comparable current operations and maintenance activities.

**Mitigation Measure 3.4-4: Avoid and Minimize Impacts on Salt Marsh Harvest Mouse and Salt Marsh Wandering Shrew**

- Ground disturbance to suitable salt marsh harvest mouse habitat (including, but not limited to pickleweed, and emergent salt marsh vegetation) shall be avoided to the extent feasible. Where salt marsh harvest mouse habitat cannot be avoided (such as for channel excavation, access routes and grading, or anywhere else that vegetation could be trampled or crushed by work activities), vegetation shall be removed to ground level from the ground disturbance work area plus a 5-foot buffer around the area, as well as any access routes within salt marsh harvest mouse habitat, utilizing mechanized hand tools or by another method approved by the USFWS and CDFW. Vegetation height shall be maintained at or below 5 inches above ground. Vegetation removal in salt marsh harvest mouse habitat shall be conducted under the supervision of the USFWS- and CDFW-approved biologist.
- To protect salt marsh harvest mouse from construction-related traffic, access roads, haul routes, and staging areas within 50 feet of salt marsh harvest mouse habitat shall be bordered by temporary exclusion fencing; or other wildlife exclusion fencing as specified in federal or state permits. The fence should be made of a material that does not allow salt marsh harvest mouse to climb or pass through, of a minimum above-

ground height of 30 inches, and the bottom should be buried to a depth of at least 6 inches so that mice cannot crawl under the fence. Any supports for the salt marsh harvest mouse exclusion fencing (e.g., t-posts) shall be placed on the side of the fence facing the interior of the Project site. The last 5 feet of the fence shall be angled away from the road to direct wildlife away from the road. A USFWS- and CDFW-approved biologist with previous salt marsh harvest mouse experience shall be on site during fence installation and shall check the fence alignment prior to vegetation clearing and fence installation to ensure that no salt marsh harvest mice are present.

- Salt marsh harvest mouse marsh habitat that must be accessed by mini-excavators or other vehicles to complete Project construction (e.g., excavating smaller channels) shall be protected through use of low ground pressure (LGP) equipment, wooden or PVC marsh mats, or other method approved by the USFWS and CDFW following vegetation removal (see 2nd bullet, above).
- Construction activities related to restoration and infrastructure shall be scheduled to avoid extreme high tides when there is potential for salt marsh harvest mouse to move to higher, drier grounds, such as ruderal and grassland habitats. No Project activities shall be conducted within 50 feet of suitable tidal marsh or other salt marsh harvest mouse habitat within 2 hours before and after an extreme high tide event (6.5 feet or higher measured at the Golden Gate Bridge and adjusted to the timing of local high tides) or when the adjacent marsh is flooded unless wildlife exclusion fencing has been installed around the work area.
- All construction equipment and materials shall be staged on existing roadways and away from suitable salt marsh harvest mouse habitat when not in use. All construction equipment shall be visually inspected prior to work activities each day for signs of salt marsh harvest mouse or any other wildlife.
- Vegetation shall be removed from all non-marsh areas of disturbance (driving roads, grading and stockpiling areas) to discourage the presence of salt marsh harvest mouse.
- A USFWS- and CDFW-approved biologist with previous salt marsh harvest mouse monitoring and/or surveying experience shall be on site during construction activities occurring in suitable habitat. The USFWS- and CDFW-approved biologist has the authority to stop Project activities if any of the requirements associated with these measures are not being fulfilled. If a harvest mouse is observed in the work area, construction activities shall cease in the immediate vicinity of the potential salt marsh harvest mouse. The individual shall be allowed to leave the area before work is resumed. If the individual does not move on its own volition, the USFWS-approved biologist would contact USFWS (and CDFW if appropriate) for further guidance on how to proceed.
- If the USFWS- and CDFW-approved biologist has requested work stoppage because of take of any of the listed species, or if a dead or injured salt marsh harvest mouse is observed, the USFWS and CDFW shall be notified within 1 day by email or telephone.

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**Impact 3.4-3: Construction or operation of the Project could have a substantial effect on special-status plants. (*Less than Significant with Mitigation*)**

Based on available habitat identified during reconnaissance-level surveys, Marin knotweed, Suisun Marsh aster, Congested-headed hayfield tarplant, and Point Reyes bird's-beak may be present within the study area. Implementation of the Project could result in direct impacts on existing populations of these species, if present. Earthwork associated with the Project could result in direct removal or trampling of special-status plants. Therefore, construction could result in potentially significant impacts on the above-named species.

No impacts are identified for ongoing maintenance activities, as the restoration of tidal marshes is expected to be beneficial for special-status plant species due to the overall increase in wetland habitat, which provides habitat for tidal marsh special-status plants, which would benefit Marin knotweed, Suisun Marsh aster, Congested-headed hayfield tarplant, and Point Reyes bird's-beak, if present.

In summary, temporary construction-related impacts would result in significant impacts on special-status plants if special-status plants are present. However, implementation of **Mitigation Measures 3.4-1 and 3.4-5** would reduce potential construction-related impacts on special-status plants to a less-than-significant level. This would be achieved by: conducting pre-construction special-status plant surveys; delineating and avoiding special-status plants within the Project work limits by establishing a no-disturbance buffer, including fencing and signage, around the plant to protect it from construction-related activity; compensating for special-status plant impacts that cannot be avoided; and reporting special-status plant occurrence to the CNDDB. With implementation of Mitigation Measure 3.4-5, construction-related impacts would be less than significant. Operational and long-term effects of the Project would be **less than significant**.

**Mitigation Measure 3.4-5: Special-Status Plant Protection**

- Prior to the start of construction, a qualified biologist shall conduct a properly timed special-status plant survey for Marin knotweed (*Polygonum marinense*), Suisun Marsh aster (*Symphyotrichum lentum*), Congested-headed hayfield tarplant (*Hemizonia congesta* subsp. *congesta*), and Point Reyes bird's-beak (*Chloropyron maritimum* ssp. *palustre*) within the species' suitable habitat within the Project work limits. The survey shall follow the CDFW Protocols for Surveying and Evaluating Impacts on Special Status Native Plant Populations and Sensitive Natural Communities (CDFW 2018). If special-status plant species are identified within the Project work limits, then the biologist shall establish an appropriate buffer area for each plant population to exclude activities that directly remove or alter the habitat of, or result in indirect adverse impacts on, the special-status plant species. A qualified biologist shall oversee installation of a temporary, mesh-type construction fence (Tensor Polygrid or equivalent) at least 4 feet (1.2 meters) tall around any established buffer areas to prevent encroachment by construction vehicles and personnel. The qualified biologist shall determine the exact location of the fencing. The fencing shall be strung tightly on posts set at maximum intervals of 10 feet (3 meters) and shall be checked and maintained weekly until all construction is complete. The buffer zone established by the fencing shall be marked by a sign stating:
  - *"This is habitat of [list rare plant(s)], and must not be disturbed. This species is protected by [the ESA of 1973, as amended/CESA/California Native Plant Protection Act]."*

- If direct impacts cannot be avoided, the City shall require the project sponsor to prepare a plan for minimizing the impacts by one or more of the following methods: (1) salvage and replant plants at the same location following construction; (2) salvage and relocate the plants to a suitable off-site location with long-term assurance of site protection; (3) collect seeds or other propagules for reintroduction at the site or elsewhere; or (4) payment of fees in lieu of preservation of individual plants, to be used for conservation efforts elsewhere**.** The City shall review and approve the plan.
- The success criterion for any seeded, planted, and/or relocated plants shall be full replacement at a 1:1 ratio after 5 years. Monitoring surveys of the seeded, planted, or transplanted individuals shall be conducted for a minimum of 5 years, to ensure that the success criterion can be achieved at year 5. If it appears the success criterion would not be met after 5 years, contingency measures may be applied. Such measures shall include, but not be limited to: additional seeding and planting, altering or implementing weed management activities, or introducing or altering other management activities.
- Any special-status plant species observed during surveys shall be reported to the CDFW and submitted to the CNDDB and reported to USFWS, if federally-listed.

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**Impact 3.4-4: The Proposed Project could have a substantial adverse effect, either directly or through habitat modification, on marine species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW, USFWS, or NOAA. (*Less than Significant with Mitigation*)**

### Construction Impacts

Implementation of the Proposed Project would require earth-moving construction activities in support of levee creation and improvements, marshplain restoration and creation, beach installation, and revegetation. A subset of the actions would occur within, or adjacent to, the aquatic environment and thus have the potential to impact special-status marine species or protected habitat. The construction of the Project elements listed above would require substantial amounts of work within the intertidal environment. Most of this work would occur in the form of fill placement in support of the conversion of habitat from intertidal and mudflat into restored tidal marsh and coarse beach. Thus, there is the potential for significant impact on aquatic species and habitat in support of these restoration actions. These activities, their potential for impact, and mitigation measures required to reduce the severity of these impacts to less-than-significant levels are discussed below.

### Turbidity Impacts

Work within the intertidal environment may result in the temporary suspension of silt, sand, and clay particles within the water column if done within a wetted environment. Increases in turbidity may occur during all construction activities within the intertidal environment construction of the beach, ecotone slope, and tidal marsh, and to a lesser degree during pile installation, tidal channel excavation, and temporary access road construction. Increased suspended solids in the water column have the potential to affect special-status fish species by disrupting normal feeding

behavior, reducing growth rates, increasing stress levels, and reducing respiratory functions. Additionally, the suspension of sediment has the potential to release constituents of concern within the water column. Severe turbidity impacts may result in substantially depressed oxygen levels (i.e., below 5.0 mg/l), which may cause respiratory stress to aquatic life and even mortality.

While construction work would proceed across the full tidal cycle, work conducted at low tide or directly on mudflat should result in negligible turbidity impacts. Work that does occur in a wetted environment may result in elevated turbidity levels within adjacent San Rafael Bay. However, due to the Project site's proximity to these deep waters, currents are expected to be strong and function to dissipate turbidity plumes within hours, if not faster. Similarly, oxygen level depression resulting from construction activities is not expected to persist due to rapid tidal flushing and the short duration of releases of anoxic (oxygen-poor) sediment. Additionally, prior to any fill placement in the aquatic environment for the tidal marsh reconstruction, sediment curtains would be installed along the perimeter of the exposed mudflat during low tide (see Chapter 2, *Project Description,* under the heading *Coarse Beach Construction*). These curtains would prevent the spread of localized turbidity impacts and serve as a barrier to any aquatic species attempting to access the Project site.

### Water Quality Impacts

Commensurate with any construction activity adjacent to, or within, an aquatic environment is the potential for the accidental discharge of hydrocarbon containing materials (e.g., fuel, lubricating oils, construction materials), construction debris, or other harmful materials. Such construction activities could pose a short-term and temporary risk of exposing resident marine taxa to toxic contaminants and non-edible forage. Prior to construction, the Project would be required to procure an NPDES Construction General Permit (See Section 3.6, *Hydrology and Water Quality,* under the heading '*NPDES Construction General Permit*). This permit requires the development and implementation of a SWPPP that includes specific BMPs designed to prevent sediment and pollutants from impacting the adjacent aquatic environment. The BMPs fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. For a more detailed description of state and local regulations governing stormwater management during Project construction, refer to Section 3.6, *Hydrology and Water Quality*, Subsection 3.6.2, *Regulatory Setting*.

### Temporary Underwater Noise

As described in Chapter 2, *Project Description,* a temporary crane platform would be installed along San Rafael Creek at the northeast corner of the Project site to unload materials and equipment brought in via barge. The platform would be a pile-supported steel and timber deck, approximately 30 square feet in size. The platform would be supported by 12 to 16 steel piles, approximately 18 inches in diameter and driven 60 to 70 feet deep using a vibratory hammer. The platform would remain in place for 1 to 3 years while the coarse beach and eroded marsh area are being constructed. Following construction, the platform would be completely removed and transported off site. Of primary concern with the in-water installation, or removal, of piles is the potential for the generation of underwater noise at a level that is harmful to marine species. The use of an impact hammer during

pile driving can produce high-intensity noise, resulting in damage to the soft tissues of fish, such as gas bladders or eyes (barotraumas) and/or result in harassment of fish and marine mammals such that they alter swimming, sleeping, or foraging behavior or temporarily abandon forage habitat.

The striking of a pile by an impact hammer creates a pulse of sound that propagates through the pile, radiating out through the water column, seafloor, and air. Sound pressure pulses, as a function of time are referred to as a waveform. Peak waveform pressure underwater is typically expressed in decibels (dB) referenced to 1 microPascal (µPa).[9] Sound levels are generally reported as peak levels, root-mean-square pressure, and sound exposure levels. The peak pressure is the highest absolute value of the measured waveform. For pile driving pulses, the root-mean-square (RMS) pressure level is determined by analyzing the waveform and computing the average of the squared pressures over time that comprise the portion of the waveform containing the vast majority of sound energy. Sound exposure level (SEL) is a metric that provides an indication of the amount of acoustical energy contained in a sound event. For pile driving, the sound exposure level can be used to describe a single impact hammer pulse or many cumulative pulses when required to drive multiple piles. In addition to the pressure pulse of the waveform, the frequency of the sound, expressed in hertz, is also important to evaluating the potential for sound impacts. Low frequency sounds are typically capable of traveling over greater distances with less reduction in the pressure waveform than high frequency sounds.

Vibratory pile drivers work on a different principle than impact hammers and therein produce a different sound profile. A vibratory driver works by inducting particle motion to the substrate immediately below and around the pile, causing liquefaction of the immediately adjacent soft substrate, allowing the pile to sink downward. Sound levels are typically 10–20 dB lower in intensity relative to the higher, pulse-type noise produced by an impact hammer (Caltrans 2020).

### Impacts on Fish

Scientific investigations on the potential effect of noise on fish indicate that sound levels below 183 dB SEL do not appear to result in any acute physical damage or mortality to fish (barotraumas) of any size (Dalen and Knutsen 1986). **Table 3.4-4** provides a summary of known acute and sub-lethal effects of noise on fish. Noise levels that result in startle responses in steelhead and salmon have been documented to occur at sound levels as low as 150 dB RMS (Halvorsen et al. 2012). Any disturbance to listed fish species that results in altered swimming, foraging, movement along a migration corridor, or any other altered normal behavior is considered harassment. It should be noted that the acoustic thresholds for fish only exist for impact hammer pile driving; no vibratory standards exist for fish at this time. In contrast with impact pile driving, vibratory pile installation appears to result in minimal acute damage to fish. As such, hydroacoustic impacts from vibratory pile installation on fish species are likely to be limited to a temporary loss in access to foraging habitat during pile installation and removal activities.

[9] Therefore, 0 dB on the decibel scale would be a measure of sound pressure of 1 µPa.

**TABLE 3.4-4**
**POTENTIAL IMPACTS ON FISH AT VARYING NOISE LEVELS**

| Taxa | Sound Level (dB) | Effect | Reference |
|---|---|---|---|
| **Fish** | | | |
| All fish > 2 grams in size | 206 peak<br>187 (SEL) | Acute barotraumas | Fisheries Hydroacoustic Working Group, 2008 |
| All fish < 2 grams | 186 (SEL) | Acute barotraumas | Fisheries Hydroacoustic Working Group, 2008 |
| Salmon, steelhead | 150 (RMS) | Avoidance behavior | Halvorsen et al. 2012 |

NOTES: SEL = sound exposure level; RMS = root-mean-square pressure level

### Impacts on Marine Mammals

Pursuant to the Marine Mammal Protection Act, the National Oceanic and Atmospheric Administration (NOAA) has established two levels of harassment related to marine mammals:

- **Level A:** Any act of pursuit, torment, or annoyance that has the potential to injure a marine mammal or marine mammal stock in the wild.
- **Level B:** Any act of pursuit, torment, or annoyance that has the potential to disturb a marine mammal or marine mammal stock in the wild by causing the disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding, or sheltering.

NOAA has applied sound thresholds to each of these harassment categories depending on the species of marine mammal. To be considered Level A harassment, marine mammals must be exposed to sound levels in exceedance of those listed below in **Table 3.4-5**. As reflected in the table, underwater noise thresholds for marine mammals differ between families and hearing groups. Level B behavioral harassment is considered to occur when any marine mammal is exposed to 120 dB RMS pressure level for vibratory pile driving or removal. Marine mammal hearing thresholds for airborne noise are 90 dB for harbor seals and 100 dB for all other pinnipeds. Since no impact pile driving is proposed, construction work is not expected generate airborne noise in exceedance of these levels.

**TABLE 3.4-5**
**ADOPTED UNDERWATER ACOUSTIC CRITERIA FOR MARINE MAMMALS**

| | NOAA-Adopted Pile Installation Criteria for Marine Mammals | | |
|---|---|---|---|
| **Family** | **Vibratory Pile Removal Disturbance Threshold (Level B Harassment)** | **Species** | **SEL Threshold (dB) (Level A Harassment)** |
| Cetacean | 120 dB RMS | Harbor porpoise | 173 dB |
| Pinniped | | Harbor seal | 201 dB |
| | | California sea lion | 219 dB |

NOTES:
dB = decibel; RMS = root-mean-square pressure level; SEL = sound exposure level.

SOURCE: NOAA 2018.

Given the uncertainties regarding the exact pile configuration and installation methods to be used for proposed in-water construction, there remains a potential that construction of the Project could have an adverse effect on protected fish or marine mammals, a **significant impact**. Thus, **Mitigation Measure 3.4-6**, **Fish and Marine Mammal Protection during Pile Driving** is proposed. This measure requires the development and implementation of a sound monitoring plan to protect fish and marine mammals. Additionally, this measure requires that the Project adhere to the observance of NMFS-approved in-water work windows. Implementation of this measure would ensure that potential impacts from pile installation are ***less than significant***.

## Operational Impacts

### Habitat Conversion

While the implementation of the Project would result in a conversion in mudflat and open water habitat to tidal marsh, this action would result in the restoration of the historical extent of tidal marsh within the site. Additionally, restored tidal marsh habitat is extremely limited within the San Francisco Bay-Delta compared to open water and mudflat, and long-term implementation of the Proposed Project may provide the following benefits:

- Enhancement of regional food web productivity and export to San Rafael Bay in support of aquatic species; in particular, special-status fish that utilize San Pablo Bay as foraging habitat including green sturgeon and longfin smelt.
- The creation of rearing habitats for out-migrating juvenile salmonids.
- The creation of rearing, breeding, and refuge habitats for a broad range of other aquatic and wetland-dependent species that utilize or depend on the combination of brackish aquatic and tidal marsh habitat, including non-listed native species.
- Enhancement to the ecosystem functions associated with the combination San Rafael Bay waters, tidal marsh, and upland interfaces that these species require.
- The creation of increased topographic variability, and diversity of habitat, to allow for habitat succession and resilience against future climate change and sea level rise.

Overall improvement within the aquatic environment of the San Francisco Bay-Delta is especially important given that populations of pelagic fish within the Delta and Suisun Marsh continue to show a significant decline in abundance, placing the continued viability of many populations in serious jeopardy (La Luz and Baxter 2015). As such, restoration or enhancement projects that create tidal marsh habitat with the potential to benefit special-status species are of paramount importance.

### Maintenance and Monitoring Actions

Physical and biological monitoring would be conducted at the completion of Project construction and at 1, 3, 5, and 10 years post-construction (see Section 2.4, *Operations and Maintenance*). The restored wetland habitats would be largely self-maintaining after the initial period of vegetation establishment. Post-construction monitoring for the Project is anticipated to lead only to minor repair and maintenance activities, primarily within the upland environment. Minor maintenance actions may include the following:

- Manual hand removal of any obstructions that may be blocking tidal channels (e.g., sediment and/or debris), if needed.
- Periodic grading, fill placement, and trail resurfacing due to additional settlement/subsidence, or earthquake damage that occurs after initial construction period (anticipated to occur once, or possibly twice, in the first 10 years after construction).
- Grading and filling of any settlement cracks that occur along the new levee, particularly at the connection to the existing trail.
- Minor repair and/or bank protection of any erosion scarps that may threaten the levee.
- Additional manual vegetation management beyond the initial establishment period, including weed control and replanting to be done by hand, and/or extended temporary watering, as needed.

Any in-channel or intertidal maintenance work would result in similar impacts on water quality and benthic habitat to the construction activities described above. Direct contact with a wetted environment may result in the degradation of water quality through temporary increases in turbidity. As described above, increases in suspended sediments can impact aquatic organisms by reducing dissolved oxygen levels and light transmission. Additionally, when sediments resettle, there is the potential to smother aquatic habitats and organisms. This maintenance work is designed to improve the long-term functionality of this habitat to support these protected species, but may result in short-term impacts during in-channel work.

The NPDES Construction General Permit described above would also be applied to any future in-channel maintenance activities. Additionally, to ensure consistency with Mitigation Measure 3.4-6, any maintenance work within tidal, wetted channel would be limited to June 1 through November 30. Observance of this work window would minimize the potential presence of special-status aquatic species within the Project site. Additionally, silt and turbidity curtains would be installed at the tidal-adjacent end of the maintenance location to intercept turbidity plumes generated from earthwork activities. Installation of these curtains prevents the export of any large amount of turbidity beyond the immediate maintenance location. These curtains may also provide the secondary benefit of reducing the likelihood that fish can enter the active work area. As such, impacts from maintenance and monitoring on aquatic species and habitat are expected to be ***less than significant with mitigation***.

### Mitigation Measures

**Mitigation Measure 3.4-6: Fish and Marine Mammal Protection During Pile Driving**

Prior to the start of any in-water construction that would require pile driving, the Project sponsor shall prepare a NOAA-approved sound attenuation monitoring plan to protect fish and marine mammals, and the approved plan shall be implemented during construction. This plan shall provide detail on the sound attenuation system, detail methods used to monitor and verify sound levels during pile driving activities (if required based on projected in-water noise levels), and describe methods to reduce impact pile-driving in the aquatic environment to an intensity level less than 120 dB (RMS) continuous noise level for marine mammals at a distance of 1,640 feet. The plan shall incorporate, but not be limited to, the following elements:

- All in-water construction shall be conducted within the established environmental work window between June 1 and November 30, designed to avoid potential impacts on fish species.

- To the extent feasible, vibratory pile drivers shall be used for the installation of all support piles. Vibratory pile driving shall be conducted following the USACE "Proposed Procedures for Permitting Projects that will Not Adversely Affect Selected Listed Species in California." The USFWS and NMFS completed Section 7 consultation on this document, which establishes general procedures for minimizing impacts on natural resources associated with projects in or adjacent to jurisdictional waters.

- If NOAA sound level criteria for marine mammals are exceeded during vibratory hammer pile installation, a NOAA-approved biological monitor shall be available to conduct surveys before and during pile driving to inspect the work zone and adjacent waters for marine mammals. The monitor shall be present as specified by NMFS during impact pile driving and ensure that:

  – The safety zones established in the sound monitoring plan for the protection of marine mammals are maintained.

  – Work activities are halted when a marine mammal enters a safety zone and resumed only after the animal has left the area or has not been observed for a minimum of 15 minutes.

**Significance after Mitigation:** Less than Significant.

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**Impact 3.4-5: The Project could have substantial adverse effects on jurisdictional wetlands, other Waters of the United States, and Waters of the State. (*Less than Significant*)**

San Rafael Creek and San Rafael Bay and associated features are Waters of the U.S. and Waters of the State. Elements of the Project would impact these features during both the construction and operation phases. The below discussion analyzes wetlands and waters collectively.

### Construction Impacts

**Table 3.4-6** provides a summary of anticipated impacts on potentially jurisdictional wetlands and waters during the construction phase of the Project. The potential impacts identified below are based on habitat mapping completed for the Habitat Assessment (ESA 2020) and the preliminary design.

**TABLE 3.4-6**
**PRELIMINARY IMPACTS ON POTENTIALLY JURISDICTIONAL WETLANDS AND WATERS**

| Water/Wetland Feature | Existing Acres | Temporary Impacts (Acres) | Permanent Impact/ Conversion (Acres) | Post-Project Acres | Post-Project Conversion in Acres |
|---|---|---|---|---|---|
| San Rafael Bay (open water /mudflat) | 12.75 | 0.10 (temporary crane platform and barge offloading area, temporary access route) | 4.67 | 8.08 | -4.67 |
| Tiscornia Marsh (tidal marsh) | 7.59 | 0.10 (temporary access road) | 0 | 14.17 (Alt 1)<br>14.24(Alt 2) | +6.58 |
| Diked Marsh | 3.95 | 0 | 3.95 | 0.07 (Alt 1)<br>0 (Alt 2) | -3.88 |
| Non-tidal Pond | 0.07 | 0 | 0.07 | 0 | -0.07 |
| Beach | 0 | 0 | 0 | 1.64 | +1.64 |
| **TOTAL** | **24.36** | **0.20** | **8.69** | **23.96** | **-0.4** |

NOTES:

The western levee tie-off has two design options. Under option 1, the non-tidal pond would be converted to diked marsh. Under option 2, the non-tidal pond would be converted to tidal marsh.

The potential impacts identified are based on the habitat mapping completed for the Habitat Assessment (ESA 2020) and the preliminary design. The potential impacts do not show the overall increase in and long-term benefits to ecological function, flood resilience, and future marsh edge erosion protection for the 24 acres of wetlands and waters on site.

### Temporary Impacts

Potential wetlands and waters would be temporarily affected by the installation of a temporary access road over a portion of the tidal marsh and open water. A temporary access road would be constructed across Tiscornia Marsh (in an east-west direction) to allow looped construction access. The temporary road would be approximately 20 feet wide and would either be constructed of timber mats or temporary fill built up to a height of 3 feet. The road would be located at two of the narrowest portions of the marsh to reduce the area of disturbance, and would include a culvert over the existing tidal channel to maintain tidal flows to the south portion of the marsh. All access road materials would be completely removed following construction.

A temporary crane platform and a barge off-loading location would be installed along San Rafael Creek as shown on Figure 2-5. These two sites would be used to unload materials and equipment brought in via barge. The platform would remain in place for 1 to 3 years while the coarse beach and eroded marsh area are being constructed. Following construction, the platform would be completely removed and transported off site. The barge location has no fringing marsh and is armored with riprap.

Temporary impacts on wetlands and waters as a result of the temporary access road, crane platform, and barge offloading location would affect a relatively small area (less than 1 percent) of wetland and waters habitat. The temporary impact is essential for constructing the restoration Project. Once construction is complete, these areas can naturally reestablish to their pre-Project condition. The City would require the Project sponsor to implement BMPs, discussed in Section

3.6, *Hydrology and Water Quality*, Impact 3.6-1, avoiding substantial temporary impacts on jurisdictional water quality as a result of potential soil erosion or accidental release of deleterious materials during construction. As such, temporary impacts on potentially jurisdictional wetlands and waters would be **less than significant**.

### Permanent Impacts

Permanent impacts on wetlands and waters would be offset by a net gain in wetland and water function and values after Project implementation. The Project would improve wetlands and open water habitats in the both the near and long term. Wetlands and waters in the study area would benefit from improved ecosystem function, flood resilience, and protection from future marsh edge erosion offered by the Project. Overall, there is expected to be an approximate 0.4-acre loss in wetlands and waters due to sea level rise adaptation elements including coarse beach construction, shoreline levee improvements, and ecotone slope development.

The habitat changes proposed by the Project are shown on Figure 2-3. The restoration of the diked marsh would permanently convert a small portion of the diked marsh to open water tidal channels and to ecotone slope or transition zone uplands (Table 3.4-6). The restoration of the diked marsh would convert the remaining diked marsh area to tidal marsh. The conversion of diked marsh to tidal marsh would improve wetland habitat structure and diversity, increase Ridgway's rail and California black rail habitat, and allow the marsh to accrete sediment, which would facilitate the marsh in becoming more resilient to sea level rise.

The restoration of beach and tidal marsh in the Bay would permanently convert a portion of tidal open water to tidal marsh and coarse beach habitat (refer to Figure 2-3, Table 3.4-6). The new beach and tidal marsh are necessary to protect the existing tidal marsh, restore previously eroded tidal marsh, and provide sea level rise resiliency. Although some other waters would be converted to tidal marsh and beach, they would remain as jurisdictional wetlands and other waters. The beach and portions of the tidal marsh would also be planted to enhance habitat conditions for native wildlife. The improved ecosystem resulting from the conversion of open water and mudflat to tidal marsh and beach would provide additional flood protection, erosion control, and habitat for tidal marsh-dependent species. The creation and planting of the new beach would provide habitat and ecosystem services that are not provided under existing conditions, such as flood and erosion protection and habitat for a diversity of marsh-dependent species.

There are currently two design options for tying the west end of the new levee into the shoreline (both represented in Figure 2-3). Under the first option (west levee tie-off option 1), the existing non-tidal marsh and pond would be converted to all non-tidal marsh. The levee placement would prevent this area from becoming tidal, although it would be enhanced by converting the existing pond, which provides poor habitat value and function, to non-tidal marsh that could become salt marsh harvest mouse habitat.

Under the second option (west levee tie-off option 2), the new levee would extend approximately 150 feet directly west to the northwest corner of the site. This option would require that a small stormwater outlet channel be excavated to the north of the new levee through the tidal marsh and into the creek. The non-tidal pond and existing diked marsh in this area would be restored to tidal

marsh and would directly connect to the converted tidal marsh to the east, providing additional habitat for tidal marsh-dependent species.

Due to sea level rise, the Project site is expected to gain future benefits to existing habitats due to increased ecological connectivity, improved tidal hydrology, and marsh erosion protection over the next 50 years, which would enhance wetlands, waters, and upland areas in and adjacent to the Project site. Although there would be some conversion of wetland and water types and a nominal loss of approximately 0.40 acre of wetlands and waters, the Project would increase the ecological function and long-term benefits of 24 acres of wetlands and waters on site including an increase in over 6 acres of tidal marsh. Therefore, the Project would result in **less-than-significant impacts** on wetlands and waters.

### Operational Impacts

Minor vegetation management and levee maintenance activities, as discussed in Chapter 2, *Project Description*, Section 2.4, *Operations and Maintenance*, are expected after the new levee is constructed and planting of native vegetation is completed. After initial revegetation, the plantings would be monitored to determine the need for additional maintenance or remedial actions, such as replacement plantings, substitute species, watering, weeding, and/or nonnative plant treatment. Minor repairs may be needed, such as manual hand removal of sediment on channels, grading, and fill placement due to levee settlement. Periodic sediment removal would result in temporary disturbance of the restored tidal channels, but there would be no permanent loss of wetlands.

Levee management and maintenance activities would not result in substantial adverse effects because maintenance activities would be beneficial to the resource, infrequent, and would only require brief periods of activity at each location when maintenance is required. Additionally, the overall net gain in the quality of restored habitat would offset any adverse impacts resulting from the Project's vegetation and levee maintenance activities. Overall, operational and maintenance activities in wetlands and waters in the study area would be **less than significant** under the Project as they would result in an enhancement of ecosystem function and continue in a similar nature as they are currently implemented.

**Mitigation:** None required.

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**Impact 3.4-6: The Project could 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. (*Less than Significant with Mitigation*)**

### Construction and Operational Impacts

#### Terrestrial Biological Resources

Wildlife movement corridors link together areas of suitable wildlife habitat that are otherwise separated by rugged terrain, changes in vegetation, or by areas of human disturbance or urban

development. Topography and other natural factors in combination with urbanization can fragment or separate large open-space areas. The fragmentation of natural habitat can create isolated "islands" of vegetation and habitat that may not provide sufficient area to accommodate sustainable populations and can adversely impact genetic and species diversity. The retention of wildlife movement corridors ameliorates the effects of such fragmentation by allowing animals to move between remaining habitats, which in turn allows depleted populations to be replenished. Such movement may also promote genetic exchange between separated populations.

The study area is not part of major or local wildlife corridor/travel routes according to the CDFW's Essential Habitat Connectivity natural landscape blocks (Spencer et al. 2010). The study area has limited upland connectivity opportunity since the upland areas surrounding the study area are developed neighborhoods. Any terrestrial wildlife movement in the area is likely habituated to high levels of human activity. However, wildlife that can fly or swim is able to move between the study area and other nearby marsh and upland habitats.

The Project would not substantially adversely interfere with the movement of any native terrestrial resident or migratory wildlife species or with an established native resident or migratory wildlife corridor, or impede the use of a native wildlife nursery site, and the impact would be **less than significant**.

### Marine Biological Resources

Central San Francisco Bay serves as a migration corridor for special-status anadromous fish between the Pacific Ocean and spawning habitat, primarily within the Sacramento and San Joaquin River watersheds, but also in a handful of tributaries to San Francisco Bay. Those that use the San Francisco Bay as a migration corridor to the Central Valley watersheds may pass by the Project site during the migratory period. Additionally, Central California Coast steelhead may occur seasonally in the waters offshore when moving between spawning streams and the Pacific Ocean. If special-status anadromous fish species were to occur within the vicinity of the Project site, their presence would only be temporary, as they move between spawning habitat and the Pacific Ocean, and would likely occur outside the window in which pile installation or other in-water work would occur. Of all the special-status fish species in the study area, longfin smelt have the greatest potential to occur within the water adjacent to the Project site. However, because longfin smelt distribution within the San Francisco Bay-Delta is driven by fluctuations in salinity, they are unlikely to occur in large numbers near the Project site outside of late summer.

In general, the presence of marine mammals in San Francisco Bay is related to the distribution and presence of prey species and foraging habitat. Harbor seals and sea lions use various intertidal substrates that are exposed at low to medium tide levels for resting and breeding. California sea lions are noted for using anthropogenic structures such as floating docks, piers, and buoys to haul out of the water to rest. Marine mammal haul-out locations do not occur in the Project study area; as such, the presence of marine mammals is likely to be confined to a few rafting or foraging individuals and not the large numbers seen elsewhere within San Francisco Bay.

Given the rarity and transient nature of regionally occurring special-status species, no sustained presence of special-status aquatic species is expected occur. With a low-likelihood of occurrence

of special-status marine species, a substantial impact on marine movement corridors unlikely. Nevertheless, the implementation of **Mitigation Measure 3.4-6**, **Fish and Marine Mammal Protection during Pile Driving**, would ensure that any construction-related impacts on marine movement corridors and established native wildlife nursery sites would be ***less than significant with mitigation***.

> **Mitigation Measure 3.4-6: Fish and Marine Mammal Protection During Pile Driving**
>
> **Significance after Mitigation:** Less than Significant

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**Impact 3.4-7: Construction and operation of Proposed Project could conflict with local policies or ordinances protecting biological resources; and could conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan. (*Less than Significant*)**

No adopted habitat conservation plan or natural community conservation plan covers the Project terrestrial or marine areas, and there are no protected significant or landmark trees on the Project site. Thus, **no impact** related to conflict with policies or plans protecting biological resources is expected to result from Project implementation.

### Construction Impacts

The City of San Rafael provides for the protection of street trees along any public street, sidewalk, or walkway in the city, and outlines requirements for removal and replacement of certain street trees in the Municipal Code (Code) Section 11.12 and 14.25.050. The Project would remove approximately one native and seven non-native trees to accommodate Project construction; and construction activities would occur in the vicinity of trees located adjacent to Spinnaker Point Drive. The native tree to be removed would be replaced as part of the Project, as noted in Section 2.3.3, Vegetation Removal. However, if the Project proponent does not implement tree removal and replacement and protection of trees to be retained on site in accordance with the Codes, an impact would occur. With implementation of Mitigation Measure 3.4-7, construction-related impacts would be **less than significant**.

### Operational Impacts

The Project would require ongoing maintenance, including vegetation trimming and other vegetation related maintenance. However, weedy species would generally be removed when small, and removal of larger trees subject to the City's tree ordinance is not anticipated under routine Project maintenance. Therefore, the Project would not affect trees protected under City requirements, and **no impact** would occur as part of Project operation.

> **Mitigation Measure 3.4-7: Tree Ordinance Requirements**
>
> - Any tree-related work (removal, planting, or pruning) shall adhere to the City of San Rafael Municipal Code Section 11.12 and 14.25.050. Specifically, written permit

must be issued to cut, prune, break, injure, or remove any living tree in, upon, or along any public street, sidewalk, or walkway in the city or cut, disturb, or interfere in any way with the roots of any tree in, upon, or along any street, sidewalk, or walkway, or spray with any chemical or insecticide any tree in, upon, or along any public street, sidewalk, or walkway, or place any sign, poster, or other fixture on any tree or tree guard, or injure, misuse, or remove any device placed to protect any tree in, upon, or along any public street, sidewalk, or walkway in the city.

Whenever any tree shall be cut down or removed in or from any sidewalk area, its butt and roots shall be dug up and removed, or cut level with the ground, as directed by the public works department.

- In the erection or repair of any building or structure, guards shall be placed around all nearby trees in, upon, or along the public streets, sidewalks, and walkways within the city as shall prevent injury to them.
- All trees shall be installed, protected and pruned in accord with accepted arboricultural standards and practices.

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**Impact 3.4-8: Construction and operation of the Proposed Project could 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 CDFW, USFWS, or NMFS. (*Less than Significant*)**

There is no riparian habitat present in the study area, and therefore no impacts would occur to this sensitive natural community. Pickleweed Mat Alliance habitat was documented within the study area and would be subject to losses during construction. Potential impacts on this vegetation community are described in Impact 3.4-5, which considers effects to jurisdictional wetlands, other Waters of the United States, and Waters of the State. Temporary impacts could occur due to disturbance by Project-related equipment, vehicles, the deposition of spoils, or equipment in the reaches listed directly above where the sensitive natural community is present. As described in Impact 3.4-5, restoration of the diked marsh would convert the remaining diked marsh area to tidal marsh, which would improve wetland habitat structure and diversity, increase pickleweed habitat, and allow the marsh to accrete sediment, which would facilitate the marsh in becoming more resilient to sea level rise. Although there would be some conversion of pickleweed and a nominal estimated loss of approximately 0.40 acre of wetlands and waters, which includes Pickleweed Mat Alliance habitat, the Project would ultimately increase the ecological function and long-term benefits of 24 acres of wetlands and waters on site, including pickleweed habitat. Therefore, the Project would result in **less-than-significant impacts** on this sensitive natural community.

Within the San Francisco-Bay Delta region, NMFS has identified eelgrass beds (*Zostera marina*) as a habitat area of particular concern. These habitat areas of particular concern are considered high-priority areas for conservation, management, or research because they are rare, sensitive, stressed by development, or important to ecosystem function. No eelgrass beds exist within the Project site, so there would be no impact on this sensitive natural community and the fish that reside within such habitat from Project construction and operation. Thus, any impact from

construction or operation of the Proposed Project on sensitive natural communities would be **less than significant**.

**Mitigation:** None required.

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## Cumulative Impacts

**Impact 3.4-9: Cumulative loss of sensitive biological resources during construction and operations. (*Less than Significant with Mitigation*)**

### Terrestrial Biological Resources

The geographic scope of potential biological resources encompasses the jurisdictional waters, and habitats for special-status species within the study area as well as biologically linked areas in the San Rafael Creek Watershed and San Rafael Bay. This regional approach is appropriate because the habitats and wildlife species that could be affected by the Project and by the projects identified in Table 3.1-1 are part of a broader ecosystem, and the potential disturbance of individual areas could have repercussions for a wider region than the immediate Project vicinity.

As discussed above, the Project could adversely affect special-status birds or nesting migratory birds and raptors in the study area, including California Ridgway's rail, California black rail, northern harrier, salt marsh common yellowthroat, San Pablo song sparrow, and other nesting migratory birds and raptors. Implementation of **Mitigation Measures 3.4-1, 3.4-2**, **and 3.4-3** would minimize potential direct impacts. The projects listed in Table 3.1-1 could also have the potential to affect these species, especially those projects that would directly affect nearby tidal waters and wetland areas. These projects may include the San Rafael Creek Operations and Maintenance, the Village at Loch Lomond Marina Project, Schoen Park Conversion of Parking, and Pickleweed Field and Park Project. These could result in similar effects as the Proposed Project. However, each of these projects would be required to complete CEQA analysis similar to that completed for the Project, but it is unknown whether the CEQA process would identify and mitigate potential special-status bird impacts and nesting migratory bird and raptor related impacts associated with those projects. Impacts on nesting birds would be cumulatively considerable pre-mitigation, but less than cumulatively considerable with adherence to Mitigation Measures 3.4-1, 3.4-2, and 3.4-3.

As described above, the Proposed Project could adversely affect salt marsh harvest house and salt marsh wandering shrew. Implementation of **Mitigation Measures 3.4-1 and 3.4-4** would minimize potential direct impacts. Some of the projects listed in Table 3.1-1 could also have the potential to affect this species if they affect salt marsh harvest mouse habitat. Salt marsh harvest mouse habitat is quite limited in the nearby area due to development and very few areas of tidal wetlands. Potential projects that could have the potential to affect this species would include the San Rafael Creek Operations and Maintenance, the Village at Loch Lomond Marina Project, Schoen Park Conversion of Parking, and Pickleweed Field and Park Project. These could result in similar effects as the Proposed Project if they would be disturbing salt marsh harvest mouse

habitat. However, each of these projects would be required to complete CEQA analysis similar to that completed for the Project, but it is unknown whether the CEQA process would identify and mitigate potential salt marsh harvest mouse impacts associated with those projects. Impacts on salt marsh harvest mouse would be cumulatively considerable pre-mitigation, but less than cumulatively considerable with adherence to Mitigation Measures 3.4-1 and 3.4-4.

As also described above, the Proposed Project would result in temporary and permanent impacts on potentially jurisdictional wetlands and waters that are located within or along San Rafael Creek and San Rafael Bay. Overall, Project design would replace existing wetlands and waters habitat to higher quality wildlife habitat and better functioning and resilient wetland habitat. While some of the projects listed in Table 3.1-1 could also have the potential to affect these habitats (namely those listed previously that could directly affect tidal or diked wetlands and waters within the San Rafael Creek watershed), the Proposed Project would not meaningfully contribute to a cumulative impact on jurisdictional wetlands and waters. Therefore, this impact would be **less than significant**.

As described above, the Proposed Project could adversely affect special-status plants. Implementation of **Mitigation Measure 3.4-5** would minimize potential direct impacts. Some of the projects listed in Table 3.1-1 could also have the potential to affect special-status plants, although special-status plant populations are limited in the nearby area due to development. Each of these projects would be required to complete CEQA analysis similar to that completed for the Proposed Project, but it is unknown whether the CEQA process would identify and mitigate potential special-status plant impacts associated with those projects. Impacts on special-status plants could be cumulatively considerable pre-mitigation, but less than cumulatively considerable with adherence to **Mitigation Measure 3.4-5.**

As described above, the upland areas around the Project site are generally surrounded by developed neighborhoods that block terrestrial wildlife migration under existing conditions. Any wildlife movement in the area is likely habituated to high levels of human activity. The Proposed Project, however, would enhance and restore habitat connectivity within tidal marsh in the Project site, and therefore would provide a net benefit for tidal marsh-dependent wildlife. Therefore, residual impacts from the Project would not combine with other cumulative scenario Project impacts, and this impact is considered **less than significant**.

As described above, the Proposed Project would remove approximately eight trees to accommodate construction. Adherence to City of San Rafael Code requirements for trees would ensure that tree protection measures would be implemented under the Proposed Project to protect trees and ensure compliance with applicable ordinances and policies. Although the Project's pre-mitigation impacts are cumulatively considerable because other cumulative scenario projects may have similar impacts on trees, post-mitigation, this impact would not be cumulatively considerable. Therefore, this impact is considered **less than significant**.

## Fisheries Resources

### Construction

The geographic scope of potential fisheries resources encompasses the intertidal and shallow subtidal environments of San Rafael Bay and San Rafael Creek. This regional approach is appropriate because the habitats and wildlife species that could be affected by the Proposed Project and by the cumulative projects identified in herein are part of a broader aquatic ecosystem, and the potential disturbance of individual areas of the watershed could have repercussions for a wider region than the immediate Project vicinity. As discussed above, direct impacts of the Project would include impacts on special-status native fish species and their aquatic habitat during Project construction. Potential categories of impact include direct impacts on fish, water quality and sediment quality impacts, underwater noise impacts, and alteration of benthic habitat.

Cumulative projects that involve in-water construction and that, in combination with the Project, have the potential to result in significant cumulative impacts on marine resources are limited ongoing operations and maintenance actions within San Rafael Creek. Operations and maintenance actions primarily consist of the periodic dredging of the San Rafael Creek channel and adjacent environment of San Rafael Bay to facilitate boat access. Dredging of this magnitude can result in elevated turbidity levels, entrainment of aquatic species, and the temporary alteration of benthic habitats. Having last been partially dredged by the USACE in 2011, dredging is slated to commence summer 2022 within San Rafael Creek. As the commencement of construction for the Proposed Project would not be until 2023, no overlap in timing would occur between these two projects. Further, impacts of the project would be reduced to less than significant with implementation of **Mitigation Measure 3.4-6**, Fish and Marine Mammal Protection during Pile Driving. Thus, any cumulative impacts as a result of Project implementation are expected to be **less than significant with mitigation**.

### Operation

The Proposed Project's operational impacts on marine biological resources may result in temporary, localized impacts in turbidity during channel maintenance actions. Of the cumulative projects examined, none would result in impacts that could combine geographically with the Project's operational effects. Therefore, cumulative impacts resulting from in-water work, and the cumulative impact on marine resources associated with operations, would be **less than significant**.

> **Impact Significance after Mitigation:** Less than Significant with Mitigation. The impacts on biological resources from the Project considered together with past, present, and reasonably foreseeable future projects would be reduced to a less than significant level with implementation of Mitigation Measures 3.4-1, 3.4-2, 3.4-3, 3.4-4, 3.4-5, and 3.4-6.

## Marine Biological resources

### Construction Impacts

The geographic scope of potential fisheries resources encompasses the intertidal and shallow subtidal environments of San Rafael Bay and San Rafael Creek. This regional approach is appropriate because the habitats and wildlife species that could be affected by the Project and by the projects identified in herein are part of a broader aquatic ecosystem, and the potential disturbance of individual areas of the watershed could have repercussions for a wider region than the immediate Project vicinity. As discussed above, direct impacts of the Project would include impacts on special-status native fish species and their aquatic habitat during Project construction. Potential categories of impact include direct impacts to fish, water quality and sediment quality impacts, underwater noise impacts, and alteration of benthic habitat.

Cumulative projects that involve in-water construction and that, in combination with the project, have the potential to result in significant cumulative impacts on marine resources are limited ongoing Operations and Maintenance actions within San Rafael Creek. Operations and Maintenance actions primarily consist of the periodic dredging of the San Rafael Creek channel and adjacent environment of San Rafael Bay to facilitate boat access. Dredging of this magnitude can result in elevated turbidity levels, entrainment of aquatic species, and the temporary alteration of benthic habitats. Having last been partially dredged by the USACE in 2011, dredging is slated to commence summer 2022 within the San Rafael Creek. As the commencement of construction for the proposed project would not occur until 2023, overlap in timing between these two projects is not anticipated. Should the Project construction period be expedited, or the USACE dredge project be delayed, overlap of the project activities could overlap and allow for beneficial reuse of dredge materials at the Project site. The Project would be required to implement BMPs designed to prevent sediment and pollutants from impacting the adjacent aquatic environment. The BMPs fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Thus, any cumulative impacts as a result of project implementation are expected to be ***less than significant***.

### Operation Impacts

The project's operational impacts on marine biological resources may result in temporary, localized impacts in turbidity during channel maintenance actions. Of the cumulative projects examined, none would result in impacts that could combine geographically with the project's operational effects. Therefore, cumulative impacts resulting from in-water work, and the cumulative impact on marine resources associated with operations, would be ***less than significant***.

**Mitigation:** None required.

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# 3.5 Greenhouse Gas Emissions

This section describes the environmental and regulatory setting of the Project site and surrounding area with respect to greenhouse gas (GHG) emissions, and includes an analysis of impacts of the Proposed Project related to GHG emissions. This assessment includes an overview of climate change; a review of the GHGs that have been identified as drivers of climate change; pertinent regulations, including those relevant at the federal, state, and local levels; significance criteria for environmental impacts; and environmental impacts associated with Project construction and operation and appropriate mitigation measures.

Emissions of air pollutants, including criteria air pollutants, are considered in Section 3.3, *Air Quality*. If needed, mitigation measures to avoid or reduce significant impacts are also identified.

## 3.5.1 Environmental Setting

### Climate Change

There is general scientific consensus that climate change is occurring and is almost certainly attributed to human activities. GHG emissions caused by human activity, if not sufficiently curtailed, are likely to contribute further to continued increases in global temperatures. Strong scientific evidence documents that the climate is changing and that its impacts are widespread and occurring now. In California, this evidence includes increases in extreme heat, wildfires, extreme storms, coastal flooding and erosion, and reductions in Sierra Nevada springtime snowpack and threats to continued water availability (ARB 2014).

Globally, climate change has the potential to adversely affect numerous environmental resources through potential, though uncertain, impacts related to future air and water temperatures, precipitation patterns, and an array of other factors. According to the Intergovernmental Panel on Climate Change (IPCC), several indicators of climate change are advancing faster than in previous assessments (IPCC 2014):

- Changing precipitation and snowmelt patterns.
- Negative effects on crop yields.
- Increased heat waves, drought, flood, wildfires, and storm events.
- Reduced renewable water resources in most dry subtropical regions.
- Damage to marine ecosystems from ocean acidification.

Also, many secondary effects are projected to result from global warming, including impacts on agriculture, changes in disease vectors, changes in habitat suitability, and potential for a reduction of biodiversity. The possible outcomes and feedback mechanisms involved are not fully understood, and much research remains to be done; however, the potential for substantial environmental, social, and economic consequences over the long term may be great.

## Greenhouse Gases

GHGs emitted as a result of human activities primarily include carbon dioxide ($CO_2$), with smaller amounts of nitrous oxide, methane (often from unburned natural gas), and less common industrial GHGs such as sulfur hexafluoride from high-voltage power equipment, and hydrofluorocarbons and perfluorocarbons from refrigeration/chiller equipment. These GHGs have different warming potentials (defined as the amount of heat trapped in the atmosphere by a certain mass of the gas), and $CO_2$ is the most common reference gas for climate change; therefore GHG emissions are often quantified and reported as $CO_2$-equivalent ($CO_2e$) emissions. For example, sulfur hexafluoride represents a small fraction of the total annual GHGs emitted worldwide, but this gas is very potent, with 22,800 times the global warming potential (GWP) of $CO_2$. Therefore, an emission of 1 metric ton of sulfur hexafluoride would be reported as 22,800 metric tons $CO_2e$. The GWPs of methane and nitrous oxide are 25 times and 298 times that of $CO_2$, respectively (ARB 2016).

**Table 3.5-1** summarizes statewide emissions of GHG from relevant source categories for 2010 through 2016. Specific contributions from individual air basins, such as the San Francisco Bay Area Air Basin, which encompasses the Project area, are included in the emissions inventory but are not itemized by air basin. In 2016, California produced 429.34 million gross metric tons of $CO_2e$ emissions. Transportation was the source of 41 percent of the state's GHG emissions, followed by industrial at 23 percent, electricity generation at 16 percent, commercial and residential sources at 12 percent, and agriculture and forestry composing the remaining 8 percent (ARB 2018).

**TABLE 3.5-1**
**CALIFORNIA GREENHOUSE GAS EMISSIONS (MILLION METRIC TONS $CO_2E$)**

| Emission Inventory Category | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | |
|---|---|---|---|---|---|---|---|
| Electricity Generation (In State) | 41.37 | 51.18 | 49.6 | 51.81 | 50.21 | 42.67 | 10% |
| Electricity Generation (Imports) | 46.94 | 44.15 | 40.24 | 36.56 | 33.88 | 26.28 | 6% |
| Transportation | 166.52 | 166.16 | 165.8 | 167.14 | 170.89 | 174.01 | 41% |
| Industrial | 100.63 | 100.89 | 103.75 | 104.23 | 102.1 | 100.37 | 23% |
| Commercial | 20.73 | 21.11 | 21.64 | 21.37 | 22.07 | 23.04 | 5% |
| Residential | 32.03 | 30.04 | 31.19 | 26.26 | 27.05 | 28.34 | 7% |
| Agriculture and Forestry | 34.89 | 36.08 | 34.61 | 35.95 | 34.41 | 33.84 | 8% |
| Not Specified (Solvents & Chemicals) | 0.79 | 0.78 | 0.77 | 0.78 | 0.79 | 0.79 | 0% |
| Total Gross Emissions | 443.9 | 450.39 | 447.6 | 444.1 | 441.4 | 429.34 | 100% |

NOTE: $CO_2e$ = carbon dioxide equivalent

SOURCE: ARB 2018

### *Greenhouse Gas Sources*

There is an important distinction between the two general sources of GHG emissions:

- ***Anthropogenic*** GHG emissions are derived from the combustion of fossil fuels. Energy-related $CO_2$ emissions, resulting from fossil fuel exploration and use, account for approximately three-quarters of the human-generated GHG emissions in the United States, primarily in the form of $CO_2$ emissions from burning fossil fuels. More than half of the energy-related emissions come from large stationary sources such as power plants; approximately one-third derive from transportation; and industrial processes, agriculture, forestry, other land uses, and waste management compose a majority of the remaining sources (EPA 2016). Anthropogenic emissions also include byproducts of certain human-managed biological processes, such as anaerobic decomposition of organic waste in landfills, wastewater treatment, and treatment of wastes from confined animal facilities such as dairies.
- ***Biogenic*** GHG emissions are derived from natural sources, including the natural decomposition of biomass[1] and combustion of biomass or biomass-derived fuels.

The distinction between anthropogenic and biogenic sources of GHG emissions is important because these sources have different impacts on the global carbon cycle. Carbon in fossil fuel reservoirs, such as coal seams and oil and gas deposits, was removed from the atmosphere by plants over millions of years. Through geologic processes, this carbon accumulated in deposits and was isolated from the active carbon cycle. Without human intervention, fossil-fuel carbon would remain isolated from the active carbon cycle into the future. Through extraction and combustion of fossil fuels, humans release this carbon, increasing the total amount of carbon in the atmosphere and in the active carbon cycle.

In contrast with fossil-fuel carbon, carbon present in biomass is cycling through the atmosphere and global carbon cycle on a much faster scale. For example, over the course of a year, carbon removed from the atmosphere by growing agricultural crops is released back into the atmosphere through the harvest, and subsequent respiration, decomposition, or combustion of the produced/ residual biomass. Over short time scales, the carbon mass released by the decomposition of biomass will generally equal the carbon mass taken up by living organisms. Because biogenic carbon is constantly being released and taken up in the carbon cycle, biogenic $CO_2$ emissions do not act to increase the total amount of carbon in the atmosphere in the same way as the release of carbon from fossil fuels (EPA 2014).

## 3.5.2 Regulatory Setting

### Federal Regulations

#### *U.S. Environmental Protection Agency*

On April 2, 2007, in *Massachusetts v. U.S. EPA*, 549 US 497, the Supreme Court found that GHGs are air pollutants covered by the Clean Air Act. The Court held that the U.S.

[1] *Biomass* is non-fossilized organic matter from plants, animals, and microorganisms, including products, byproducts, and wastes from agriculture, forestry, and related industries, as well as the non-fossilized biodegradable fractions of industrial and municipal wastes, including gases and liquids recovered from its decomposition.

Environmental Protection Agency (EPA) must determine whether GHG emissions from new motor vehicles cause or contribute to air pollution, which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. In making these decisions, EPA is required to follow the language of Section 202(a) of the Clean Air Act, which obligates it to prescribe (and from time to time revise) standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines. The Supreme Court decision resulted from a petition for rulemaking under Section 202(a) of the Clean Air Act filed by more than a dozen environmental, renewable energy, and other organizations.

On April 17, 2009, the EPA Administrator signed proposed "endangerment" and "cause or contribute" findings for GHGs under Clean Air Act Section 202(a). EPA found that six GHGs, taken in combination, endanger both the public health and the public welfare of current and future generations. EPA also found that the combined emissions of these GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse effect as air pollution that endangers public health and welfare under Clean Air Act Section 202(a). Pursuant to Code of Federal Regulations Title 40, Part 52, Proposed Prevention of Significant Deterioration and Title V Greenhouse Gas Tailoring Rule, EPA has mandated that Prevention of Significant Deterioration (PSD) and Title V requirements apply to facilities whose stationary-source $CO_2e$ emissions exceed 100,000 tons per year (EPA 2019).

### *U.S. Supreme Court Decision in* Utility Air Regulatory Group v. U.S. EPA

On June 23, 2014, the U.S. Supreme Court held that EPA may not treat GHG emissions as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V permit. The Court also held that PSD permits that are otherwise required (based on emissions of other pollutants) may continue to require limitations on GHG emissions based on the application of best available control technology.

In accordance with the Supreme Court decision, on April 10, 2015, the U.S. Court of Appeals for the District of Columbia Circuit issued an amended judgment in *Coalition for Responsible Regulation, Inc. v. U.S. Environmental Protection Agency*. The amended judgment vacated the PSD and Title V regulations under review in that case, to the extent that they require a stationary source to obtain a PSD or Title V permit solely because the source emits or has the potential to emit GHGs above the applicable major source thresholds. The Circuit Court also directed EPA to consider whether any further revisions to its regulations are appropriate, and if so, to undertake to make such revisions.

In response to the Supreme Court decision and the Circuit Court's amended judgment, EPA intends to conduct future rulemaking actions to make appropriate revisions to the PSD and operating permit rules (EPA 2019).

## State Regulations

A variety of statewide rules and regulations have been implemented or are in development in California that mandate the quantification or reduction of GHGs. Under CEQA, analysis and mitigation of GHG emissions and climate change in relation to a proposed project is required

when the lead agency determines that a project would result in a significant addition of GHGs to the atmosphere.

### *Executive Order S-3-05*

Executive Order S-3-05, issued by Governor Arnold Schwarzenegger in June 2006, established statewide emission reduction targets through the year 2050 as follows:

- By 2010, reduce GHG emissions to 2000 levels.
- By 2020, reduce GHG emissions to 1990 levels.
- By 2050, reduce GHG emissions to 80 percent below 1990 levels.

This executive order does not include any specific requirements that pertain to the Proposed Project; however, future actions taken by the state to implement these goals may affect the Project, depending on the specific implementation measures developed.

### *Assembly Bill 32*

California Assembly Bill (AB) 32, the Global Warming Solutions Act of 2006, required the California Air Resources Board (ARB) to establish a statewide GHG emissions cap for 2020 based on 1990 emissions levels. AB 32 required ARB to adopt regulations that identify and require selected sectors or categories of emitters of GHGs to report and verify their statewide GHG emissions, and authorized ARB to enforce compliance with the program.

Under AB 32, ARB was also required to adopt a statewide GHG emissions limit equivalent to the statewide GHG emissions levels in 1990, which must be achieved by 2020. In December 2007, ARB updated its established limit to 431 million metric tons $CO_2e$, based on updated GWPs from the IPCC's Fourth Assessment Report. This is approximately 15 percent below forecasted "business-as-usual" emissions of 509 million metric tons $CO_2e$ in 2020 (ARB 2014).

In the interest of achieving the maximum technologically feasible and cost-effective GHG emissions reductions, AB 32 permits the use of market-based compliance mechanisms and requires ARB to monitor compliance with and enforce any rule, regulation, order, emissions limitation, emissions reduction measure, or market-based compliance mechanism that it adopts.

#### Climate Change Scoping Plan (AB 32 Scoping Plan)

In December 2008, ARB approved the Climate Change Scoping Plan (AB 32 Scoping Plan), outlining the State of California's strategy to achieve the 2020 GHG emissions limit. The AB 32 Scoping Plan estimates a reduction of 174 million metric tons $CO_2e$ (about 191 million tons) from the transportation, energy, agriculture, forestry, and high-climate-change-potential sectors. The plan proposes a comprehensive set of actions designed to reduce overall GHG emissions in California, improve the environment, reduce dependence on oil, diversify California's energy sources, save energy, create new jobs, and enhance public health.

Appendices C and E of the adopted 2008 AB 32 Scoping Plan include a list of 39 recommended action measures to reduce GHG emissions (ARB 2009). Of these measures, none are directly relevant to the Proposed Project.

The AB 32 Scoping Plan must be updated every five years to evaluate the adopted mix of AB 32 policies to ensure that California is on track to achieve the 2020 GHG emissions reduction goal. ARB has released two Scoping Plan Updates, in May 2014 and November 2017 (for additional information about the 2017 Scoping Plan Update, see the *Executive Order B-30-15* section, below). No recommended actions identified in the Scoping Plan Update are directly applicable to the Proposed Project.

### *Senate Bill 97*

In 2007, the California Legislature enacted Senate Bill (SB) 97, which required amendment of the CEQA Guidelines to incorporate analysis of, and mitigation for, GHG emissions from projects subject to CEQA. The amendments took effect March 18, 2010.

The amendments added Section 15064.4 to the CEQA Guidelines, specifically addressing the potential significance of GHG emissions. Section 15064.4 neither requires nor recommends a specific analytical methodology or quantitative criteria for determining the significance of GHG emissions. Rather, the section calls for a "good faith effort" to "describe, calculate, or estimate" GHG emissions and indicates that the analysis of the significance of any GHG impacts should consider the extent to which the project would:

- Increase or reduce GHG emissions.
- Exceed a locally applicable threshold of significance.
- Comply with "regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of greenhouse gas emissions."

The CEQA Guidelines also state that a project may be found to have a less-than-significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (Section 15064(h)(3)). Importantly, however, the CEQA Guidelines do not require or recommend a specific analytical methodology or provide quantitative criteria for determining the significance of GHG emissions.

### *Executive Order B-30-15*

In April 2015, Governor Edmund G. Brown Jr. issued an executive order to establish a California GHG emissions reduction target of 40 percent below 1990 levels by 2030. Reaching this target will make it possible for California to reach its ultimate goal of reducing emissions 80 percent under 1990 levels by 2050, as identified in Executive Order S-3-05. Executive Order B-30-15 also specifically addresses the need for climate adaptation and directs state government to do all of the following (Office of Governor Brown 2015):

- Incorporate climate change impacts into the state's Five-Year Infrastructure Plan.

- Update the *Safeguarding California Plan*, the state's climate adaption strategy to identify how climate change will affect California infrastructure and industry and what actions the state can take to reduce the risks posed by climate change.
- Factor climate change into state agencies' planning and investment decisions.
- Implement measures under existing agency and departmental authority to reduce GHG emissions.

Executive Order B-30-15 required ARB to update the AB 32 Scoping Plan to incorporate the 2030 target. ARB adopted the 2017 Scoping Plan for achieving the 2030 target, which takes into account the key programs associated with implementation of the AB 32 Scoping Plan—such as GHG emissions reduction programs for cars, trucks, fuels, industry, and electrical generation—and builds upon, in particular, existing programs related to the Cap-and-Trade Regulation; the Low Carbon Fuel Standard; much cleaner cars, trucks, and freight movement; power generation for the state using cleaner renewable energy; and strategies to reduce methane emissions from agricultural and other wastes by using it to meet the state's energy needs. The 2017 Scoping Plan also addresses, for the first time, GHG emissions from natural and working lands, including the agriculture and forestry sectors (ARB 2017).

### *Senate Bill 32 and Assembly Bill 197*

On August 23, 2016, the California Assembly passed SB 32, legislation that would extend California's landmark climate change legislation to require that California reduce its emissions to 40 percent below 1990 levels by 2030, an extension of AB 32's goal to reduce emissions to 1990 levels. SB 32 became fully enacted the next day when AB 197 was passed, as an amendment to SB 32 stated that it would only become operative if AB 197 was enacted. AB 197's key components are as follows:

- Directs ARB to enact environmental justice and social costs when designing climate change regulations.
- Creates a new entity called the Joint Legislative Committee on Climate Change Policies, authorized to do fact-finding and make recommendations to the Legislature regarding the state's climate change programs.
- Makes substantial changes to how ARB functions, increasing the number of board members and adjusting the terms of service, and strengthens the board member service disqualification process.
- Establishes the intention to decrease ARB's reliance on cap-and-trade to achieve reductions and instead directs ARB to prioritize direct emissions reductions at large stationary sources.

### *Executive Order B-55-18*

On September 10, 2018, Governor Brown signed Executive Order B-55-18, committing California to total, economy-wide carbon neutrality by 2045. Executive Order B-55-18 directs ARB to work with relevant state agencies to develop a framework to implement and accounting that tracks progress toward this goal.

## Local Plans and Policies

### *Bay Area Air Quality Management District*

The Bay Area Air Quality Management District (BAAQMD) lays the groundwork for GHG emissions reductions through the 2017 Clean Air Plan. The 2017 Clean Air Plan provides a long-term vision of how the Bay Area could and function in a year 2050 post-carbon economy, and describes a control strategy that BAAQMD will implement over the next three to five years. The 2017 Clean Air Plan also includes measures designed to reduce GHG emissions.

### *City of San Rafael*

The City has several documents that guide the reduction of GHG emissions and endeavor to reduce the impacts of climate change, including the *Climate Change Action Plan 2030,* described below.

#### San Rafael Climate Change Action Plan 2030

In 2009, the City of San Rafael adopted the Climate Change Action Plan (CCAP) in response to AB 32, the California Global Warming Solutions Act. The CCAP includes strategies for transportation, waste reduction, land use, energy conservation, and sequestration that aim to reduce GHG emissions by 25 percent below 2005 levels by 2020. The intention of these strategies is to set a path toward reducing GHG emissions by 80 percent below 2005 levels by 2050. The CCAP was first updated in 2011 to allow the City to use the CCAP as a quantified GHG reduction strategy and streamline the analysis of future projects under CEQA.

On May 6, 2019, the City adopted the Final Draft Climate Change Action Plan 2030 (CCAP 2030), an update to the 2009 CCAP that establishes a new interim target of reducing GHG emissions by 40 percent below 1990 levels by 2030, and outlines the steps that residents, businesses, and the City can take to reach that goal. The CCAP 2030 has been prepared pursuant to CEQA Guidelines Section 15183.5 and is considered a qualified GHG reduction plan for purposes of streamlining CEQA analysis. The following actions would be applicable to the Proposed Project:

> **Action SA-C4: Prepare for and Adapt to a Rising Sea Level**
>
> **d.** Investigate developing flood control projects and modifying the City's land use regulations for areas subject to increased flooding from sea level rise.
>
> **Action WR-C3: Construction & Demolition Debris and Self-Haul Waste**. Require all loads of construction & demolition debris and self-haul waste to be processed for recovery of materials as feasible. Investigate creation of an ordinance requiring deconstruction of buildings proposed for demolition or remodeling when materials of significant historical, cultural, aesthetic, functional or reuse value can be salvaged.

## 3.5.3 Impacts and Mitigation Measures

### Significance Criteria

The criteria used to determine the significance of impacts related to GHG emissions are based on Appendix G of the CEQA Guidelines. The Proposed Project would have a significant impact if it would:

- Generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.
- Conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs.

With regard to the first GHG impact criterion, CEQA allows the use of the significance criteria established by the applicable air district to assess the impact of a project relative to GHG emissions. For land use projects with operations that are not stationary sources, BAAQMD's CEQA Guidelines recommend using an operational significance threshold of 1,100 metric tons $CO_2e$ per year; for stationary-source projects, the recommended significance threshold is 10,000 metric tons $CO_2e$ per year (BAAQMD 2017). The former threshold was developed to address achieving GHG reductions for the 2020 GHG reduction target established by Executive Order S-3-05. Because the Proposed Project would be constructed in years beyond 2020, an updated threshold will be necessary. BAAQMD guidance does not identify an applicable significance threshold for construction-related GHG emissions.

Because the Proposed Project would include no new stationary operational sources of GHG emissions, the stationary-source significance threshold of 10,000 metric tons $CO_2e$ per year is not an appropriate threshold to gauge the impact significance of the Project.

GHGs generated during construction are considered temporary, in that they would occur for only a few years during construction; however, for this analysis, construction-related GHG emissions were amortized over the Proposed Project's assumed 30-year lifetime. Consistent with guidance from other air districts (e.g., the South Coast Air Quality Management District), the amortized annual emissions were compared to an adjusted BAAQMD threshold to address Executive Order B-30-15 and the 2017 Scoping Plan emissions reduction goal of lowering GHG emissions to 40 percent below 1990 levels by 2030.

Therefore, even though the Proposed Project is not a typical land use development project, this EIR nonetheless starts with the significance threshold of 1,100 metric tons $CO_2e$ per year to evaluate whether the Project's GHG emissions could have a significant impact on the environment. Using this threshold results in approximately 59 percent of all projects being above the significance threshold and having to implement feasible mitigation measures to meet their CEQA obligations. These projects account for approximately 92 percent of all GHG emissions that were anticipated to occur through 2020 from new land use development in the Bay Area (BAAQMD 2017). If all land use–related project emissions were mitigated to below this threshold, it would represent an overall reduction in new land use project–related emissions of up to 92 percent.

It is acknowledged that this significance threshold was developed to focus on emissions reductions by 2020, and that BAAQMD staff and ARB have not yet provided guidance or recommendations for significance thresholds to evaluate consistency with emissions reduction goals for years beyond 2020. The emissions reductions goal of Executive Order B-30-15 and the 2017 Scoping Plan is to lower GHG emissions to 40 percent below 1990 levels by 2030. This updated goal is roughly equivalent to reducing emissions by 40 percent below current levels, and the Executive Order S-3-05 emissions reductions goal of lowering GHG emissions to 80 percent below 1990 levels by 2050 is roughly equivalent to reducing emissions by 80 percent below current levels.

Again, BAAQMD does not have quantitative thresholds of significance for GHG emissions from a project's construction. Instead, BAAQMD recommends that lead agencies quantify and disclose GHG emissions that would occur during construction and make a determination on the significance of these construction-generated GHG impacts.

In the absence of significance thresholds specifically designed to focus on operational emissions reductions beyond 2020 and construction emissions, the Project's amortized construction-related GHG emissions over its useful life[2] were compared to and adjusted BAAQMD's operational GHG threshold of significance that is 40 percent below the 2020 mass emissions threshold of 1,100 metric tons $CO_2e$ per year, i.e., 660 metric tons $CO_2e$ per year.

With regard to the second GHG impact criterion, the CEQA Guidelines state that a project may be found to have a less-than-significant impact related to GHG emissions if it complies with an adopted plan that includes specific measures to sufficiently reduce GHG emissions (Section 15064(h)(3)).

## Approach to Analysis

Construction-related emissions that would be associated with the Proposed Project have been quantified using the methods presented for comparison to a threshold conservatively based on BAAQMD guidance. If the estimated Project GHG emissions exceed the applicable threshold and cannot be mitigated to below it, the Project's impacts related to generation of GHG emissions could result in a significant impact. The Project has also been evaluated for consistency with the City's CCAP and the state's 2017 Scoping Plan Update.

GHG emissions during on-site and off-site Project construction activities were estimated using the California Emissions Estimator Model (CalEEMod), version 2020.4.0. CalEEMod was developed by the South Coast Air Quality Management District and other California air districts to assist lead agencies in determining projects' air quality and GHG emissions impacts. The model, which combines the databases from ARB's EMFAC and OFFROAD models into a single tool, estimated the Project's GHG emissions–producing activities as metric tons $CO_2e$. A standalone spreadsheet with industry-based marine vessel emissions calculations was used to derive GHG emissions from the operation of the tugboat and workboat.

[2] The Project's useful life is estimated to be 30 years.

Project assumptions for the GHG emissions analysis were developed in consultation with the applicant's contractor to reflect each phase of Project construction. These assumptions included a conservative construction scenario with maximum concurrent activities, which would result in an limited construction schedule (generally September through December) over three consecutive years. The information used for the analysis consisted of a customized phased schedule along with a list of required off-road construction equipment, equipment workdays, worker trips, hauling trips, and mileage of trips required to complete the Project. This information was then entered into CalEEMod to estimate the Proposed Project's annual construction-related mass emissions of GHGs. CalEEMod defaults were used for Project components in which there were no Project-specific data, primarily load factors. Appendix C, *Air Quality and Greenhouse Gas Emissions Supporting Documentation*, contains the construction schedule, assumptions, emissions summary tables, and CalEEMod output sheets used to quantify the Project's construction emissions of GHGs.

## Impact Summary

**Table 3.5-2** provides a summary of Project impacts related to GHG emissions.

**TABLE 3.5-2**
**SUMMARY OF GREENHOUSE GAS EMISSIONS IMPACTS**

| Impact Statement | Construction | Operation |
|---|---|---|
| **Impact 3.5-1:** The Project could generate GHG emissions that would exceed the Bay Area Air Quality Management District's threshold of significance for GHG emissions. | LTS | LTS |
| **Impact 3.5-2:** The Project could conflict with applicable plans, policies, and regulations adopted for the purposes of reducing GHG emissions. | LTS | LTS |

NOTES:
LTS = Less than significant

## Impact Analysis

### Impact 3.5-1: The Project could generate GHG emissions that would exceed the Bay Area Air Quality Management District's threshold of significance for GHG emissions. *(Less than Significant)*

#### Construction and Operation Emissions

**Table 3.5-3** shows the GHG emissions estimated to be generated by Project construction activities. Project construction would begin in September 2023 and finish at the end of 2025. As shown in Table 3.5-3, the Project's construction over the three-year construction period would generate a total of 1,307 metric tons $CO_2e$. See the *Approach to Analysis* section above for a discussion of the methods used to estimate construction emissions; see Appendix C for details on the calculations and assumptions used to estimate the construction emissions.

**TABLE 3.5-3**
**TOTAL AND AMORTIZED GREENHOUSE GAS CONSTRUCTION EMISSIONS**

| Source | $CO_2e$ (metric tons) |
|---|---|
| Phase 1 On-site Construction and Haul Trucks | 325 |
| Phase 1 Marine Emissions (tugboat and work boat) | 147 |
| Phase 2 On-site Construction and haul trucks | 679 |
| Phase 2 Marine Emissions (tugboat and work boat) | 136 |
| Phase 3 On-site Construction and Haul Trucks | 109 |
| Phase 3 Marine Emissions (tugboat and work boat) | 20 |
| Total Construction | 1,307 |
| 30-year Annual Amortized Construction | 44 |
| BAAQMD GHG Annual Mass Emissions Threshold for Non-Stationary Sources | 1,100 |
| Adjusted BAAQMD GHG Annual Mass Emissions Threshold for Nonstationary Sources to Address Year 2030 Reduction Targets | 660 |
| **Threshold Exceeded?** | **No** |

NOTES:

BAAQMD = Bay Area Air Quality Management District; $CO_2e$ = carbon dioxide equivalent; GHG = greenhouse gas

SOURCE: Data compiled by Environmental Science Associates in 2021 (see Appendix C).

As described in the *Approach to Analysis* section, the Project's amortized annual construction GHG emissions were compared to BAAQMD's operational threshold of significance for nonstationary sources, as adjusted to reflect year 2030 emission reduction targets. **Table 3.5-3** shows that the Project's total amortized construction and operational GHG emissions, based on a 30-year Project life span, would be below the applicable threshold. Therefore, this impact would be **less than significant**.

While it is expected that levee foundation soils removed are sandy soils appropriate for reuse for the tidal marsh reconstruction; it is possible that some portion of the foundation soils would require export and disposal offsite, and additional imported soil would then be required for the tidal marsh reconstruction. However, the emissions in Table 3.5-3 from on-road truck hauling (2,250 trips) only account for six percent of the total project CO2e emissions, which are dominated by on-site construction equipment. Therefore, the potential increase in truck transport to accommodate additional export and import of foundational soil, if required, would only marginally increase project CO2e emissions and the impact would remain less than significant should this additional transport be required.

**Mitigation:** None required.

**Impact 3.5-2: The Project could conflict with applicable plans, policies, and regulations adopted for the purposes of reducing GHG emissions. *(Less than Significant)***

Applicable plans, policies, and regulations promulgated by the City of San Rafael were discussed earlier in this section. One of two potentially applicable actions of the City's CCAP 2030 for a construction project is WR-C3 (Construction & Demolition Debris and Self-Haul Waste), which requires that all loads of construction and demolition debris and self-haul waste be processed for recovery of materials as feasible. The Proposed Project would not involve waste disposal, as no demolition is proposed. Excavated materials would be reused on-site.

The other potentially applicable action of the City's CCAP 2030 is SA-C4 (Prepare for and Adapt to a Rising Sea Level). As stated in Section 2.1.3, *Goals and Objectives*, in Chapter 2, *Project Description*, one of the primary goals of the proposed Project is to *create sustainable benefits that consider future environmental changes such as sea-level rise and sedimentation.* Therefore, the Proposed Project is consistent with measures in the CCAP 2030. The Project would not conflict with the City's Climate Action Plan.

Because no recommended actions identified in the 2017 Scoping Plan Update are directly applicable to the Proposed Project, Project construction would generally be consistent with applicable provisions of the 2017 Scoping Plan. Additionally, as discussed for Impact 3.5-1, the Project would be in conformance with BAAQMD's GHG emissions thresholds. Therefore, the Proposed Project would comply with the City's applicable plans, policies, and regulations for reducing GHG emissions, and this impact would be **less than significant**.

**Mitigation:** None required.

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## Cumulative Impacts

Climate change is the cumulative effect of all natural and anthropogenic sources of GHGs accumulated on a global scale. The GHG emissions from an individual project, even a very large development project, would not individually generate sufficient GHG emissions to measurably influence global climate change, and thus, the assessment of GHG emissions impacts is inherently cumulative.

Consideration of a project's climate change impact, therefore, is essentially an analysis of a project's contribution to a cumulatively significant global impact through its emission of GHGs. Although it is possible to examine the quantity of GHGs that would be emitted from individual project sources, it is not currently possible to link these GHGs emitted from a specific source or location to particular global climate changes.

Both BAAQMD and the California Air Pollution Control Officers Association consider GHG impacts to be exclusively cumulative impacts, in that no single project could, by itself, result in a substantial change in the climate (BAAQMD 2012; CAPCOA 2008). Therefore, the evaluation of cumulative GHG impacts presented above evaluates whether the Proposed Project would make a considerable contribution to cumulative climate change effects.

As such, the analysis in Impact 3.5-1 considers the potential cumulative impacts of the Proposed Project related to GHG emissions. Implementation of the Project would not result in a cumulatively considerable contribution to annual GHG emissions. As such, implementation of the Proposed Project would not result in a cumulatively considerable impact.

**Mitigation:** None required.

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## 3.5.4 References

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U.S. Environmental Protection Agency (EPA). 2019. Clean Air Act Permitting for Greenhouse Gas Emissions. Available: https://www.epa.gov/nsr/clean-air-act-permitting-greenhouse-gases. Last updated December 10, 2019. Accessed June 9, 2021.

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# 3.6 Hydrology and Water Quality

This section evaluates the potential for the Proposed Project to result in adverse impacts related to hydrology and water quality. The analysis is based on a review of available hydrology and water quality reports and maps of the Project site and vicinity, including site-specific investigations; relevant regulations; and a discussion of the methodology and thresholds used to determine whether the Proposed Project would result in significant impacts. This section relies in part on the following site-specific investigations, which are included in Appendix E:

- *San Rafael Sea-Level Rise Adaptation Technical Guidance Study* (ESA 2020a).
- *Geotechnical Investigation, Restore Eroded and Diked Marsh, Tiscornia Marsh Habitat Restoration, San Rafael, California* (Hultgren-Tillis 2021).
- *Tiscornia Marsh Habitat Restoration and Sea Level Rise Adaptation Project: Conceptual Design Report* (ESA 2018).
- *Tiscornia Marsh Restoration and Sea Level Rise Adaptation Project – Habitat Assessment* (ESA 2020b; refer to Appendix D).

## 3.6.1 Environmental Setting

### Regional Setting

The current configuration of the greater San Francisco Bay Area, including the Project site, began to form after the last ice age when the sea level rose, flooding the valleys (Hultgren-Tillis 2021). Eroded fine-grained silt and clay particles were carried down streams to the Bay, where they met the relatively quiet Bay waters and settled to form the highly plastic clay and silt estuary deposit known as San Francisco Bay Mud (Bay Mud). The accretion of Bay Mud formed mudflats and marshlands throughout the margins of the Bay Area. Marshlands around much of the Bay were diked and reclaimed in the early- to mid-1900s, with artificial fill placed on top of the former mudflats and marshlands.

In this regional area on the east side of Marin County, runoff reaches the Bay primarily from Las Gallinas Creek (north of the Project site) and San Rafael Creek, which flows along the north side of the Project site (ESA 2020a). Tributaries Irwin Creek and Mahon Creek drain into San Rafael Creek in the downtown area west of the Project site. San Rafael Creek drains a 6.4-square-mile watershed in central and northern San Rafael that is largely urban. The City's stormwater system also conveys runoff to the Bay. Because of the low elevations behind the shoreline, pump stations are located throughout the City to lift stormwater into San Rafael Creek and the Bay.

### Local Setting

#### *Surface Water Hydrology*

As shown on Figure 2-1, the Project site is located in Tiscornia Marsh, where San Rafael Creek enters San Rafael Bay. As shown on Figure 2-2, the Project site consists of the diked marsh area, eroded tidal marsh area north and east of the diked marsh, and shoreline levees. San Rafael Creek

flows eastward along the north side of the Project site into San Rafael Bay on the east side of the Project site. All drainage from the Project site is to the creek to the north and the Bay to the east.

There are no drainage channels or structures within the diked marsh area. Stormwater within the diked marsh area infiltrates into sediments or evaporates. The levees that define the diked marsh area prevent stormwater from flowing directly into the creek or Bay. The tidal marsh area has one north-south tidal channel that drains from the southern portion of the tidal marsh area to the north into the creek. Direct rainfall into the tidal marsh area flows as sheet flow into the Creek to the north or the Bay to the east. Elevations of existing conditions are summarized below (ESA 2018; Hultgren and Tillis 2021):

- Elevations within the soccer field area adjacent to the Project site range from 7 to 8 feet North American Vertical Datum (NAVD88).
- The elevation of the berm along the north side of the soccer field ranges from 8 to 10 feet NAVD88.
- Elevation of the diked marsh area and the tidal marsh area range from about 6 to 7 feet NAVD88.
- The crest of the shoreline levee ranges in elevation from 9 to 12 feet NAVD88.

The local storm drains within the soccer field flow to City storm drains on Canal Street, and ultimately the City's pump station on Kerner Boulevard. The pump station discharges via a 48-inch storm drain that runs north-south along the west side of the soccer field, and discharges into San Rafael Creek. There are no other man-made drainage structures within the Project site, other than the shoreline levee.

## *Flooding and Sea Level Rise*

### FEMA

Flood mapping characterizes the extent and depth of flood hazards from coastal and watershed sources. The Federal Emergency Management Agency (FEMA) conducts mapping nationwide to inform flood management and its flood insurance program. FEMA, through its Flood Insurance Rate Mapping (FIRM) program, designates areas where flooding could occur during 100-year and 500-year flood events.[1] FEMA has recently updated the coastal flood maps for the City (FEMA 2016). According to the FEMA FIRM, the Project site and surrounding area adjacent to the Project site are within Zone AE coastal flood hazard area (100-year flood zone) and have a base flood elevation (BFE) of 10 feet NAVD88. As summarized above, elevations at the Project site are below the BFE, which allows for overtopping of the levees and flooding of low-lying areas during storm events and higher tides (ESA 2020a).

### Sea Level Rise and Erosion

The accumulation of human-produced greenhouse gases in the Earth's atmosphere is causing and will continue to cause global warming and climate change (ESA 2020a). Along the Bay shoreline,

[1] A 100-year flood event has a 1 percent probability of being exceeded in any given year. A 500-year flood event has a 0.2 percent probability of being exceeded in any given year.

climate change causes sea level rise due to the thermal expansion of the ocean's waters and melting of ice sheets. Over the last century, the tide gauge in San Francisco has recorded sea level rise of about 8 inches.

The tidal marshlands have experienced considerable erosion over the past 30 years, retreating as much as 200 feet, with approximately 3 acres lost (ESA 2020b). Tiscornia Marsh is one of a very few small areas of tidal marsh remaining in Central San Rafael. Historically, tidal marshes extended deep into what today is downtown San Rafael, and historic mapping shows that the location of the current levee along the west side of Tiscornia Marsh was the historic wetland/bay shoreline. Tiscornia Marsh was most likely formed from accretion on the historic mudflats. The marsh is comprised of a thin band of high-marsh habitat, dominated by pickleweed, which transitions abruptly from a 3- to 4-foot escarpment to a wide mudflat extending bayward. This band of marshland is most narrow at its north end, expands to the south along the adjacent levee and soccer field, and becomes very thin as it curves eastward along the shoreline levee bordering the south end of the marsh. As previously noted, a single tidal channel enters the marsh from the northern edge bordering San Rafael Creek and extends southward through most of the length of the marsh.

Prior to the development the shoreline area, Tiscornia Marsh formed the edge of open bay/mudflats immediately adjacent to a larger marsh complex that existed from a little east of today's shoreline deep into downtown San Rafael, with San Rafael Creek bisecting and supporting much of this tidal marsh. By 1943, levees had been constructed along the shoreline and marsh had accreted on the mudflats bayward of what was the historic wetland shoreline. Aside from the larger scale changes that were occurring throughout the Bay Area within the past century, sediment delivery to the site was also altered by development of the City of San Rafael, filling of the Bay, and construction of the Spinnaker neighborhood to the south. More recently, recurrent maintenance dredging of San Rafael Creek for navigation purposes has created a local sediment sink adjacent to the marsh.

Aerial images dating from 1987 indicate that the marsh has been eroding rapidly in the last several decades (ESA 2018). The retreat of the bayward marsh edge has been most rapid at the northern edge of the site, eroding at a rate of 4 to 5 feet per year since 2004, when most aerial images were available. The rate of retreat decreases with distance moving south along the marsh edge, declining to as little as 1 foot per year where the marsh intersects the shoreline.

### Tsunami and Seiche

Tsunamis are ocean waves generated by vertical movement of the sea floor, normally associated with earthquakes or volcanic eruptions. The Association of Bay Area Governments (ABAG) provides hazard maps, including coastal areas susceptible to tsunamis. The tidal marsh zone is designated as entirely within the tsunami zone (ABAG 2021). The diked marsh area is not designated as within a tsunami zone. The City of San Rafael General Plan (Safety and Resilience Element) describes the tsunami hazard in San Rafael as an unlikely occurrence with a moderate potential impact on the San Rafael shoreline (City of San Rafael 2021). However, given the low elevations of the Project site, should a tsunami occur, flooding would affect low-lying areas, especially areas that are only a few feet above sea level.

Seiches are water-level oscillations in an enclosed or semi-enclosed body of water such as a lake, reservoir, or harbor that result from seismic events, wind stress, volcanic eruptions, underwater landslides, or local basin reflections of tsunamis. The Project site is adjacent to San Rafael Creek, which could be the source of a seiche caused by a seismic event.

### *Surface Water Quality*

There are no creeks or stormwater drains within the Project site and thus no freshwater flow. Water in the channel within the tidal marsh area is a brackish mix of marine water from the bay and some freshwater from San Rafael Creek. Urban runoff in the region drained by San Rafael Creek would include some pollutants from industrial waste discharges and urban stormwater runoff. Pollutant sources include both point and non-point discharges. A point source is any discernible, confined, and discrete conveyance (e.g., a pipe discharge) of pollutants to a water body from sources such as industrial facilities or wastewater treatment plants. Non-point pollutant sources are those that do not have a single, identifiable discharge point but are rather a combination of many sources. For example, a non-point source can be stormwater runoff from land that contains petroleum from parking lots, pesticides from farming operations, or sediment from soil erosion.

### *Groundwater*

The Project site is located within the San Rafael Valley Groundwater Basin 2-029 (DWR 2021). This location is not within a medium- to high-priority basin (i.e., overdrafted) and is not subject to the Sustainable Groundwater Management Act. Given the location of the Project site adjacent to the Bay, the depth to groundwater is largely controlled by the elevation of the surrounding Bay water and is subject to tidal fluctuations. The Bay Muds that underlie the artificial fill would not provide significant sources of groundwater supply. The water quality of groundwater is expected to be brackish, similar to the surrounding Bay water.

## 3.6.2 Regulatory Setting

## Federal Regulations

### *Clean Water Act (CWA) and Associated Environmental Compliance*

Several sections of the CWA pertain to regulating impacts on waters of the United States. As discussed in Section 3.4, *Biological Resources*, the Project site is likely associated with waters of the U.S. The discharge of dredged or fill material into waters of the U.S. is subject to permitting specified under Title IV (Permits and Licenses) of the CWA. The sections below summarize the CWA sections that are applicable to the Proposed Project.

#### National Pollutant Discharge Elimination System (NPDES) Permit Program

The NPDES permit program was established in the CWA to regulate municipal and industrial point discharges to surface waters of the U.S. Each NPDES permit for point discharges contains limits on allowable concentrations of pollutants contained in discharges. The CWA was amended in 1987 to require NPDES permits for non-point source (i.e., stormwater) pollutants in discharges. Stormwater sources are diffuse and originate over a wide area rather than from a definable point. The goal of NPDES stormwater regulations is to improve the quality of stormwater discharged to

receiving waters to the "maximum extent practicable" through the use of structural and non-structural best management practices (BMPs). BMPs can include the development and implementation of various practices such as educational measures (workshops informing the public of what impacts result when household chemicals are dumped into storm drains), regulatory measures (local authority of drainage facility design), public policy measures, and structural measures (filter strips, grass swales, and detention ponds).

### CWA Section 303: Water Quality Standards and Implementation Plans

Water quality objectives for all waters of the U.S. are established under applicable provisions of Section 303 of the federal CWA. The State of California adopts water quality standards to protect beneficial uses of state waters as required by Section 303 of the CWA and the Porter-Cologne Water Quality Control Act of 1969 (Porter-Cologne). Section 303(d) of the CWA established the Total Maximum Daily Load (TMDL) process to guide the application of state water quality standards (see the discussion of state water quality standards below). To identify candidate water bodies for the TMDL analysis, a list of water quality–limited streams and other water bodies was generated. These water bodies are impaired by the presence of pollutants, including sediment, and are more sensitive to disturbance. Section 303(d) listings associated with water bodies are included in the Water Board's Water Quality Control Plan, described further under state regulations. The CWA prohibits the discharge of pollutants to navigable waters from a point source unless authorized by an NPDES permit. Because implementation of these regulations has been delegated to the state, additional information regarding this permit is discussed under the state subheading, below.

### CWA Section 401: Water Quality Certification

Section 401 of the CWA (33 USC §1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into navigable waters, including the crossing of rivers or streams during road, pipeline, or transmission line construction, to obtain a water quality certification from the state in which the discharge originates. The water quality certification ensures that the discharge will comply with the applicable effluent limitations and water quality standards. The state agency responsible for implementing Section 401 of the CWA in California is the Regional Water Quality Control Board (RWQCB). Under the CWA, the Water Board must issue or waive Section 401 water quality certification for a project to be permitted under Section 404 (as described further below). Water quality certification requires the evaluation of water quality considerations associated with dredging or the placement of fill materials into waters of the U.S. and imposes project-specific conditions on development. A Section 401 waiver establishes conditions that apply to any project that qualifies for a waiver. Because the Project requires a federal permit, a Section 401 Water Quality Certification would be required.

### CWA Section 402: National Pollutant Discharge Elimination System

Section 402 of the CWA regulates construction-related stormwater discharges to surface waters through the NPDES program, administered by the U.S. Environmental Protection Agency (EPA) with implementation authority in California delegated to the State Water Resources Control Board (SWRCB). An NPDES Construction General Permit is required for all projects that disturb 1 acre or more of land. Therefore, the Project would require coverage under the NPDES General Construction Permit.

As part of the permitting effort, the Project would be required to file a public Notice of Intent to discharge stormwater associated with the Project; develop a Stormwater Pollution Prevention Plan (SWPPP), which includes BMPs to be implemented to prevent soil erosion and discharge of other construction-related pollutants that could contaminate nearby surface waters; and conduct periodic monitoring and reporting to ensure that BMPs are correctly implemented and effective in controlling the discharge of stormwater-related pollutants. The SWPPP and all associated BMPs must meet the requirements of the NPDES Construction General Permit for construction stormwater discharge (described further below in the section on state regulations).

#### CWA Section 404: Discharge of Dredged or Fill Material

Section 404 of the CWA (33 USC §1344) authorizes the Secretary of the Army, acting through the Chief of Engineers, to issue permits for the discharge of dredged or fill material into the waters of the U.S. at specified disposal sites (33 Code of Federal Regulations [CFR] Part 323). The term "waters of the U.S." includes wetlands and non-wetland bodies of water that meet specific criteria as defined in the CFR and applicable U.S. Army Corps of Engineers (USACE) guidance. The selection and use of disposal sites will be in accordance with guidelines developed by the Administrator of the EPA in conjunction with the Secretary of the Army and published in 40 CFR Part 230 (the "guidelines"). 40 CFR Part 230 Subpart C includes water quality aspects of dredge and fill activities. Among other topics, these guidelines address discharges, which alter substrate elevation or contours, suspended particulates, water clarity, nutrients and chemical content, current patterns and water circulation, water fluctuations, and salinity gradients. The Project would discharge dredged or fill material into waters of the U.S. and therefore require a CWA Section 404 Permit (see Section 3.4, *Biological Resources*, for details about fill in waters of the U.S.).

#### Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 USC §136 et seq. (1996)

FIFRA provides for federal regulation of the distribution, sale, and use of pesticides. Pesticides include any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest. All pesticides distributed or sold in the U.S. must be registered (licensed) by the EPA. Before the EPA may register a pesticide under FIFRA, the applicant must show, among other things, that using the pesticide according to specifications "*will not generally cause unreasonable adverse effects on the environment.*" FIFRA defines the term "*unreasonable adverse effects on the environment*" to mean: "*(1) any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide, or (2) a human dietary risk from residues that result from a use of a pesticide in or on any food inconsistent with the standard under section 408 of the Federal Food, Drug, and Cosmetic Act."* Training is required for workers in pesticide-treated areas and certification and training for applicators of restricted use pesticides.

## State Regulations

### *Porter-Cologne Water Quality Control Act Overview*

The Porter-Cologne Water Quality Control Act (Water Code §13000 et seq.), passed in 1969, requires the protection of water quality by appropriate design, sizing, and construction of erosion and sediment controls. The Porter-Cologne Act established the SWRCB and divided California

into nine regions, each overseen by a RWQCB. The SWRCB is the primary state agency responsible for protecting the quality of the state's surface and groundwater supplies and has delegated primary implementation authority to the nine RWQCBs. The Porter-Cologne Act assigns responsibility for implementing CWA Sections 401 through 402 and 303(d) to the SWRCB and the nine RWQCBs.

Coverage under a Construction Stormwater General Permit (Construction General Permit, discussed further below) requires the preparation and implementation of a SWPPP. The SWPPP includes pollution prevention measures (erosion and sediment control measures and measures to control non-stormwater discharges and hazardous spills), demonstration of compliance with all applicable local and regional erosion and sediment control standards, identification of responsible parties, a detailed construction timeline, and a BMP monitoring and maintenance schedule.

### Water Quality Control Plan (Basin Plan)

The preparation and adoption of Basin Plans are required by California Water Code Section 13240. According to Water Code Section 13050, Basin Plans establish the beneficial uses to be protected for the waters within a specified area, water quality objectives to protect those uses, and an implementation program for achieving the objectives. Because beneficial uses, together with their corresponding water quality objectives, can be defined per federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the state and federal requirements for water quality control. In relevant part, Article X, Section 2 of the California Constitution declares:

> "*[B]ecause of the conditions prevailing in this State, the general welfare requires that the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare…"*

The Water Quality Control Plan for the San Francisco Bay Area Region (Basin Plan) is designed to preserve and enhance water quality and protect beneficial uses of all waters (RWQCB 2019). Specifically, it:

1. Designates beneficial uses for surface and groundwaters.
2. Sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy.
3. Describes implementation programs for achieving objectives to protect all waters in the region.

In addition, the Basin Plan incorporates all applicable State and Regional Board plans and policies and other pertinent water quality policies and regulations. The Project would be required to meet water quality objectives and maintain the beneficial uses set out in the Basin Plan. The Basin Plan designates the following beneficial uses for San Rafael Creek:

- **Cold Freshwater Habitat** - Uses of water that support cold water ecosystems, including, but not limited to, the preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. Cold freshwater habitats generally support trout and may support anadromous salmon and steelhead fisheries as well. Cold water habitats are commonly well-oxygenated. Life within these waters is relatively intolerant to environmental stresses. Often, soft waters feed cold water habitats. These waters render fish more susceptible to toxic metals, such as copper, because of their lower buffering capacity.
- **Warm Freshwater Habitat** - Uses of water that support warm water ecosystems including, but not limited to, the preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates. The warm freshwater habitats supporting bass, bluegill, perch, and other fish are generally lakes and reservoirs, although some minor streams serve this purpose where streamflow is sufficient to sustain the fishery. The habitat is also important to a variety of nonfish species, such as frogs, crayfish, and insects, which provide food for fish and small mammals. This habitat is less sensitive to environmental changes, but more diverse than the cold freshwater habitat, and natural fluctuations in temperature, dissolved oxygen, pH, and turbidity are usually greater.
- **Wildlife Habitat** - Uses of waters that support wildlife habitats, including, but not limited to, the preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl. The two most important types of wildlife habitat are riparian and wetland habitats. These habitats can be threatened by development, erosion, and sedimentation, as well as by poor water quality. The water quality requirements of wildlife pertain to the water directly ingested, the aquatic habitat itself, and the effect of water quality on the production of food materials. Waterfowl habitat is particularly sensitive to changes in water quality. Dissolved oxygen, pH, alkalinity, salinity, turbidity, settleable matter, oil, toxicants, and specific disease organisms are water quality characteristics particularly important to waterfowl habitat. Dissolved oxygen is needed in waterfowl habitats to suppress the development of botulism organisms; botulism has killed millions of waterfowl. It is particularly important to maintain adequate circulation and aerobic conditions in shallow fringe areas of ponds or reservoirs where botulism has caused problems.
- **Water Contact Recreation** - Uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, whitewater activities, fishing, and uses of natural hot springs.
- **Non-contact Water Recreation** - Uses of water for recreational activities involving proximity to water, but not normally involving contact with water where water ingestion is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating, tide pool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.
- **Navigation** - Uses of water for shipping, travel, or other transportation by private, military, or commercial vessels. Navigation is a designated use where water is used for shipping, travel, or other transportation by private, military, or commercial vessels.

### NPDES Construction General Permit

Construction associated with the Project would disturb more than 1 acre of land surface affecting the quality of stormwater discharges into waters of the U.S. The Project would, therefore, be subject to the *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). The Construction General Permit regulates discharges of pollutants in stormwater associated with construction activity to waters of the U.S. from construction sites that disturb 1 acre or more of land surface, or that are part of a common plan of development or sale that disturbs more than 1 acre of land surface. The permit regulates stormwater discharges associated with construction or demolition activities, such as clearing and excavation; construction of buildings; and linear underground projects, including the installation of water pipelines and other utility lines.

The Construction General Permit requires that construction sites be assigned a risk level of 1 (low), 2 (medium), or 3 (high), based both on the sediment transport risk at the site and the receiving waters' risk during periods of soil exposure (e.g., grading and site stabilization). The sediment risk level reflects the relative amount of sediment that could potentially be discharged to receiving water bodies and is based on the nature of the construction activities and the location of the site relative to receiving water bodies. The receiving waters risk level reflects the risk to the receiving waters from the sediment discharge. Depending on the risk level, construction projects could be subject to the following requirements:

- Effluent standards
- Good site management housekeeping
- Non-stormwater management
- Erosion and sediment controls
- Runon and runoff controls
- Inspection, maintenance, and repair
- Monitoring and reporting requirements

The Construction General Permit requires the development and implementation of a SWPPP that includes specific BMPs designed to prevent sediment and pollutants from contacting stormwater from moving off site into receiving waters. The BMPs fall into several categories, including erosion control, sediment control, waste management, and good housekeeping, and are intended to protect surface water quality by preventing the off-site migration of eroded soil and construction-related pollutants from the construction area. Routine inspection of all BMPs is required under the provisions of the Construction General Permit. In addition, the SWPPP is required to contain a visual monitoring program, a chemical monitoring program for non-visible pollutants, and a sediment monitoring plan if the site discharges directly to a water body listed on the 303(d) list for sediment.

The SWPPP must be prepared before the construction begins. The SWPPP must contain a site map(s) that delineates the construction work area, existing and proposed buildings, parcel boundaries, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns across the project area. The SWPPP must list BMPs and the placement of those BMPs that the applicant would use to protect stormwater

runoff. Examples of typical construction BMPs include scheduling or limiting certain activities to dry periods, installing sediment barriers such as silt fence and fiber rolls, and maintaining equipment and vehicles used for construction. Non-stormwater management measures include installing specific discharge controls during certain activities, such as paving operations, vehicle and equipment washing, and fueling. The Construction General Permit also sets post-construction standards (i.e., implementation of BMPs to reduce pollutants in stormwater discharges from the site following construction).

In the Project vicinity, the Construction General Permit is implemented and enforced by the San Francisco Bay RWQCB, which administers the stormwater permitting program. Dischargers must electronically submit a notice of intent and permit registration documents to obtain coverage under this Construction General Permit. Dischargers are to notify the RWQCB of violations or incidents of non-compliance, and submit annual reports identifying deficiencies in the BMPs and explaining how the deficiencies were corrected. The risk assessment and SWPPP must be prepared by a State Qualified SWPPP Developer, and implementation of the SWPPP must be overseen by a State Qualified SWPPP Practitioner. A legally responsible person, who is legally authorized to sign and certify permit registration documents, is responsible for obtaining coverage under the permit.

### *San Francisco Bay Conservation and Development Commission*

The San Francisco Bay Conservation and Development Commission (BCDC) has regulatory jurisdiction as defined by the McAteer-Petris Act (Public Resources Code [PRC] Section 66610), over the Bay and its shoreline, which generally consists of the area between the Bay shoreline and a line 100 feet landward of and parallel to the shoreline. Sea level rise vulnerability and risk assessments are required when planning shoreline areas or designing larger shoreline projects in BCDC's jurisdiction. Risk assessments must be based on the best available estimates of future sea level rise. New projects on Bay fill, likely to be affected by future sea level rise and storm surge activity during the life of the project, must meet additional requirements, and when feasible, integrate hard shoreline protection structures with natural features that enhance the Bay ecosystem (e.g., including marsh and/or upland vegetation). The report *San Rafael Sea-Level Rise Adaptation Technical Guidance Study* prepared by Environmental Science Associates provides the sea level rise vulnerability and risk assessment for the Project site (ESA 2020a).

### *California State Lands Commission and AB 691*

The California State Lands Commission has jurisdiction over tidelands and submerged lands along the entire coast, and within 3 nautical miles offshore from the ordinary high water mark. The California State Lands Commission requires sea level rise planning by Legislative Trust Grantees (such as the City of San Rafael) and requires grantees with average annual gross public trust revenues over $250,000 to prepare and submit a sea level rise plan to the California State Lands Commission no later than July 1, 2019. The report *San Rafael Sea-Level Rise Adaptation Technical Guidance Study* prepared by Environmental Science Associates provides the sea level rise vulnerability and risk assessment for the Project site (ESA 2020a).

### *California Department of Pesticide Regulation (CDPR), 3 CCR Food and Agriculture, Division 6. Pesticides and Pest Control Operations*

The California Department of Pesticide Regulation (CDPR) is dedicated to protecting human health and the environment by regulating the sale and use of pesticides, and by fostering reduced-risk pest management. Pesticides includes any herbicide, insecticide, rodenticide, algaecide, fungicide, or any combination of substances intended to prevent, destroy, or repel any pest. These regulations provide pesticide registration and licensing procedures, list restricted materials, work and worker safety requirements, and environmental protections for groundwater, surface water, air, and aquatic environments. The entities applying herbicides will be required to comply with CDPR regulations.

## Local Plans and Policies

### *San Rafael General Plan 2040 - Safety Element*

The Safety portion of the General Plan addresses the protection of life and property from natural hazards, including earthquakes, landslides, wildfire, and flooding. The General Plan provides policies and standards for the type, location, intensity, and design of development in areas of potential hazards. The intent is not to remove all risks associated with each specific type of hazard, but to reduce risks to life and property and to make informed decisions about land use and development near these hazards.

**Goal S-3:** Resilience to Flooding and Sea Level Rise Recognize, plan for, and successfully adapt to the anticipated effects of increased flooding and sea level rise.

***Policy S-3.7:*** Shoreline Levees Improve and expand San Rafael's shoreline levee system. When private properties are developed or redeveloped, require levee upgrading as appropriate, based on anticipated high tide and flood conditions.

*Program S-3.7A:* Levee Improvement Plans. Assess existing levees, berms, and flood control systems to identify reaches with the greatest vulnerability. Develop improvement plans based on existing conditions and projected needs, as documented in adaptation plans. This should include improvement studies for the Spinnaker Point levee, as recommended by the LHMP, and the Canalways levee along San Rafael Bay.

*Program S-3.7B:* Financing Levee Improvements. Coordinate with property owners; residents and businesses; federal, state, and regional agencies; utilities; and other stakeholders to evaluate potential methods of improving levees and funding ongoing levee maintenance, including assessment or maintenance districts. The cost and fiscal impacts of levee improvements should be evaluated against potential benefits and costs and consequences of inaction.

**Goal S-2:** Resilience to Geologic Hazards Minimize potential risks associated with geologic hazards, including earthquake-induced ground shaking and liquefaction, landslides, mudslides, erosion, sedimentation, and settlement.

***Policy S-2.5:*** Erosion Control Require appropriate control measures in areas susceptible to erosion, in conjunction with proposed development. Erosion control measures should incorporate best management practices (BMPs) and should be coordinated with requirements for on-site water retention, water quality improvements, and runoff control.

*Program S-2.5A:* Erosion and Sediment Control Plans. Require Erosion and Sediment Control Plans (ESCPs) for projects meeting the criteria defined by the

Marin County Stormwater Pollution Prevention Program, including those requiring grading permits and those with the potential for significant erosion and sediment discharges. Projects that disturb more than one acre of soil must prepare a Stormwater Pollution Prevention Plan, pursuant to State law.

*Program S-2.5B:* Grading During the Wet Season. Avoid grading during the wet season due to soil instability and sedimentation risks, unless the City Engineer determines such risks will not be present. Require that development projects implement erosion and/or sediment control measures and runoff discharge measures based on their potential to impact storm drains, drainageways, and creeks.

*Program S-2.5C:* Sediment Use. Explore the use of sediment from human activities such as dredging and natural processes such as erosion for wetlands restoration and shoreline resiliency projects.

### *Marin County Pesticide Enforcement*

The Marin County Department of Agriculture/Weights and Measures oversees the use of pesticides in Marin County. As previously noted, this includes the use of herbicides. Employers are required to document their written pesticide handler training program, and pesticide handlers are required to document receiving training in the application of pesticides in accordance with the previously summarized federal and state regulations.

## 3.6.3 Impacts and Mitigation Measures

### Significance Criteria

The criteria used to determine the significance of impacts related to hydrology and water quality are based on Appendix G of the CEQA Guidelines. The Proposed Project would have a significant impact if it would:

- Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality.
- Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would:
  - Result in substantial erosion or siltation on or off site.
  - Substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site.
  - 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.
  - Impede or redirect flood flows.
- In flood hazard, tsunami, or seiche zones, risk a release of pollutants due to Project inundation.
- Conflict with or obstruct the implementation of a water quality control plan or sustainable groundwater management plan.

## Approach to Analysis

### *General*

This environmental analysis of the potential impacts related to hydrology and water quality is based on a review of the results of the site-specific geotechnical investigation (Appendix E), habitat assessment (Appendix D), and the sea level rise study (Appendix E); a review of published literature; and the City of San Rafael General Plan 2040.

The Proposed Project would be regulated by the various laws, regulations, and policies summarized above in Section 3.6.2. Compliance by the Project with applicable federal, state, and local laws and regulations is assumed in this analysis, and local and state agencies would be expected to continue to enforce applicable requirements to the extent that they do so now. Note that compliance with many of the regulations is a condition of permit approval.

After considering the implementation of the Project described in Chapter 2, *Project Description*, and compliance with the required regulatory requirements, the environmental analysis below identifies if the defined significance thresholds are exceeded and, therefore, a significant impact would occur. For those impacts considered to be significant, mitigation measures are proposed to the extent feasible to reduce the identified impacts.

The structural elements of the Project would undergo appropriate design-level geotechnical evaluations prior to final design and construction. Implementing the regulatory requirements of USACE and City of San Rafael codes and regulations, and ensuring that the Project would be constructed in compliance with the law is the responsibility of the Project engineers and building officials. The geotechnical engineer, [2] as a registered professional with the State of California, is required to comply with federal, state, and local regulations while applying standard engineering practice and the appropriate standard of care for the particular region in California, which, in the case of the Project, is the City of San Rafael. The California Professional Engineers Act (Building and Professions Code Sections 6700-6799), and the Codes of Professional Conduct, as administered by the California Board of Professional Engineers and Land Surveyors, provides the basis for regulating and enforcing engineering practice in California. The local building officials are typically with the local jurisdiction (i.e., City of San Rafael) and are responsible for inspections and ensuring regulatory compliance prior to approval of permits.

A significant impact would occur if, after considering the features described in the Project Description and the required compliance with regulatory requirements, a significant impact would still occur. For those impacts considered to be significant, mitigation measures are proposed to reduce the identified impacts.

[2] A geotechnical engineer (GE) specializes in structural behavior of soil and rocks. GEs conduct soil investigations, determine soil and rock characteristics, provide input to structural engineers, and provide recommendations to address problematic soils.

### *USACE Levee Construction Guidance*

The design and restoration of the levees would be conducted using guidance from the following USACE documents that cover levees:

- **Engineer Manual 1110-2-1913, Design and Construction of Levees** – This Engineer Manual provides USACE basic guidance principles for designing and constructing levees. The geotechnical investigation used guidance from this Engineers Manual in developing the design (Hultgren-Tillis 2021).
- **Engineer Circular 1165-2-212, Sea-Level Change Considerations for Civil Works Programs** – This Engineer Circular provides USACE guidance for incorporating the direct and indirect physical effects of projected future sea level change across the Project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining USACE projects and systems of projects. The preparation of the Sea Level Rise Adaptation Technical Guidance Study addresses this guidance (ESA 2020a).

As discussed above in Section 3.6.1, *Environmental Setting*, to inform the Project design, a preliminary geotechnical investigation was conducted to investigate site conditions and identify potential geotechnical issues (Hultgren-Tillis 2021, provided in Appendix E). To address potential geotechnical issues, which include issues related to hydrology and water quality, the geotechnical investigation provided the preliminary geotechnical recommendations listed below. Further details are provided in the preliminary geotechnical investigation and would be further developed in the final geotechnical investigation.

- **Levee Design**: The crests of the levees would be designed and maintained at a minimum elevation of +13 feet NAVD88, with a width of at least 12 feet at the crest and side slopes of 3H:1V or flatter. The initial crest elevation should be +14 feet NAVD88 to account for settlement. The existing sand fill beneath the footprint of the levee embankment along the new setback and offset levees should be overexcavated and removed. The new setback ecotone levee should also include a keyway. The levee keyway should be centered on the levee centerline and should be 3 feet deep and 12 feet wide at the base. The existing sand fill and keyway should be replaced with low-permeable material meeting the requirements below for fill. The slopes should extend up the ground surface at 2H:1V. The levee footprint should be cleared and grubbed to remove vegetation.
- **Fill Materials**: The levee would be constructed using low permeability, fine-grained soils. The USACE has fill specifications for levees that require the use of fill that is typically lean clays or plastic clayey sand. Typically, fill materials require at least 20 percent fines (passing the No. 200 sieve), a plasticity index of 8 or more, and a liquid limit of no more than 50.
- **Tidal Marsh and Beach Protection**: The expanded tidal marsh and its shoreline would be protected by through placement of dredge materials to raise site grades, a coarse beach along the eastern marsh edge, and a flexible jetty structure along San Rafael Creek to the north. The purpose of the coarse beach is to protect the expanded tidal marsh from erosion. The purpose of the jetty is to trap and accumulate sediment within the proposed expanded tidal marsh and to reduce erosion of the coarse beach. Both the coarse beach and jetty would stabilize the shoreline.
- **Erosion and Site Drainage**: Drainage off the levee would be by sheet flow. Ground surfaces should slope away from the levee crest and toe. Irregularities that may tend to concentrate

drainage should be corrected to re-establish sheet flow. Ponding of surface water should not be allowed on the levee crest or toe.

### *Sea Level Rise*

To plan for the existing and future hazards from sea level rise, the San Rafael Department of Public Works initiated a sea level rise adaptation study in collaboration with the Department of Community Development, Marin County, and ESA (ESA 2020a). To plan for the estimated sea-level rise, the study developed a sea level rise adaptation plan with the following objectives:

- Assess existing flood risk and flood risk that includes future sea-level rise projections.
- Develop reasonable and feasible sea level rise adaptations appropriate to the City's shoreline.
- Evaluate adaptation measures to characterize the measures' costs and benefits.
- Integrate recommended measures into a phased adaptation plan to guide implementation.

To achieve these objectives, the study conducted flood hazard mapping and vulnerability assessments for the City shoreline, including the shoreline at the Project site, which is designated as Bayfront South, Spinnaker Point Focus Area BF-1.

Because specifics about future greenhouse gas emissions and climate response are not fully known, the exact sea level rise scenario that will occur is not precisely known at this time. However, considering a range of all but the most-extreme scenario, sea level rise by 2100 is projected to be between 2 and nearly 7 feet in San Francisco Bay by 2100. The BFE for the 1 percent annual chance flood event varies along the San Rafael shoreline from elevations 10 to 13 feet NAVD88. The BFEs are derived from the 1 percent-annual-chance total water level (TWL), which includes still water elevation level and wave runup. The 1 percent-annual-chance still water elevation level (SWL) along the San Rafael shoreline is a constant 9.7 feet NAVD88. The variability in BFEs is due to varying wave exposure and shoreline geometry. The BFE at the Project site is estimated at 10 feet NAVD88. The design elevation of the levee crest is 13 feet NAVD88, which includes an additional 3 feet of freeboard to account for uncertainties and to provide some sea level rise resilience. (The previously summarized geotechnical investigation recommended that the levee initially be constructed to elevation 14 feet NAVD88 to allow for settlement.)

## Topics Considered and Determined to Have No Impact

The following topics are considered to have no impact based on the characteristics of the Proposed Project, its geographical location, and underlying site conditions. Therefore, these topics are not addressed further in this EIR for the following reasons:

- ***Groundwater Supplies or Recharge:*** The Project does not include the extraction of groundwater or the construction of impervious surfaces. Therefore, relative to groundwater supplies and recharge, the Project would have no impact.

## Impact Summary

**Table 3.6-1** provides a summary of Project impacts related to hydrology and water quality.

**TABLE 3.6-1**
**SUMMARY OF HYDROLOGY AND WATER QUALITY IMPACTS**

| Impact Statement | Construction | Operation |
|---|---|---|
| **Impact 3.6-1:** The Project could violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality. | LTS | LTS |
| **Impact 3.6-2:** The Project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site; substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site; 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; or impede or redirect flood flows. | LTS | LTS |
| **Impact 3.6-3:** The Project could risk the release of pollutants in flood hazard, tsunami, or seiche zones. | LTS | LTS |
| **Impact 3.6-4:** The Project could conflict with or obstruct the implementation of a water quality control plan or sustainable groundwater management plan. | LTS | LTS |
| **Impact 3.6-5:** The Project, combined with cumulative development in the Project vicinity, would not result in significant cumulative impacts relative to hydrology or water quality. | LTS | LTS |

NOTES:
LTS = Less than significant

## Impact Analysis

### Impact 3.6-1: The Project could violate water quality standards or waste discharge requirements or otherwise substantially degrade water quality. *(Less than Significant)*

#### Construction

Construction of the Proposed Project would include earthmoving activities such as excavation; trenching; grading; importation of fill; and construction of levees, a jetty, and a coarse beach. Construction activities have the potential to adversely affect water quality through the release of pollutants associated with construction equipment (e.g., fuel, motor oil) or sediments released due to excavation and fill placement.

Because the overall footprint of construction activities would exceed 1 acre, the Proposed Project would be required to comply with the NPDES General Permit for Discharges of Storm Water Runoff 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*) (Construction General Permit) and the local stormwater ordinances, as described above in Section 3.6.2. These state and local requirements were developed to ensure that stormwater runoff is controlled on construction sites. The Construction General Permit requires preparation and implementation of a SWPPP, which requires the application of BMPs to control runon and runoff from construction

work sites. The BMPs would include, but would not be limited to, physical barriers to prevent erosion and sedimentation (e.g., straw wattles, silt fences, sediment curtains, settling basins), limitations on work periods during storm events, protection of stockpiled materials, and a variety of other measures that would substantially reduce or prevent erosion from occurring during construction. In addition, the SWPPP would list the hazardous materials (including petroleum products) proposed for use during construction; describe spill prevention measures, equipment inspections, equipment and fuel storage; describe protocols for responding immediately to spills; and describe BMPs for controlling site runon and runoff of these materials and on-site exposed soil. With compliance with existing regulations, impacts associated with water quality during construction would be **less than significant**.

### Operation

Once constructed, the restored wetland habitat would be largely self-maintaining after the vegetation has been re-established. As described in Section 2.4, *Operations and Maintenance*, maintenance for the tidal marsh, ecotone slope, and coarse beach during the 3- to 5-year establishment period would include the removal of invasive plants using mechanical means, and the temporary irrigation of ecotone slope plantings. While unlikely, use of localized herbicides would be employed, if highly invasive species become present at the site. As summarized in Section 3.6.2, the CDPR regulates the use of herbicides. In addition, the new and improved flood protection levees and trails would require periodic inspection to identify maintenance and adaptive management needs. At a minimum, levees would be inspected annually to identify any localized settlement, rodent holes, or other conditions that could compromise the levee integrity. To ensure that the Project performs as anticipated, performance monitoring activities would include the following:

- Manual removal of any obstructions that may be blocking tidal channels (e.g., sediment and/or debris), if needed.
- Periodic grading, fill placement, and trail resurfacing due to additional settlement/subsidence that occurs after the initial construction period (anticipated to occur once, or possibly twice, in the first 10 years after construction).
- Grading and filling of any settlement cracks that occur along the new levee, particularly at the connection to the existing trail.
- Minor repair and/or bank protection of any erosion scarps that may threaten the levee.
- Additional manual vegetation management beyond the initial establishment period, including weed control and replanting to be done by hand, and/or extended temporary watering, as needed.

Performance monitoring would be conducted as needed for permit compliance and other objectives, including establishing baseline conditions and monitoring Project performance. Physical and biological monitoring would be conducted at the completion of Project construction and at 1, 3, 5, and 10 years post-construction. Monitoring would include levee crest surveys to identify any areas of excessive settlement that need to be addressed. With compliance with existing regulations and implementation of the adaptive management activities, impacts associated with water quality would be **less than significant**.

**Mitigation:** None required.

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**Impact 3.6-2: The Project could substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner that would result in substantial erosion or siltation on or off site; substantially increase the rate or amount of surface runoff in a manner that would result in flooding on or off site; 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; or impede or redirect flood flows.** ***(Less than Significant)***

**Construction**

The construction of the Project could substantially alter the drainage pattern of the site if not properly constructed, resulting in erosion, siltation, flooding, or exceeding stormwater drainage system, or create an additional source of pollution (including fuel, motor oil, and sediments). In particular, much of the work would be conducted in the marsh or Bay, and the ground disturbance would have the potential to result in substantial erosion or siltation, result in flooding on or off site, provide additional sources of polluted runoff, or impede or redirect flood flows.

Construction of the Proposed Project would include earthmoving activities such as excavation, trenching, grading, and importation of fill. As discussed in above in Impact 3.6-1, construction contractors would be required to obtain coverage under the NPDES Construction General Permit, with specific requirements prior to the issuance of a construction permit for the Project. The Construction General Permit requires the preparation and implementation a SWPPP for construction activities. BMPs described in the SWPPP would control the volume and velocity of runoff, if any. In particular, the Project would include the installation of a sediment curtain outboard of the in-water construction areas to prevent sediment from being discharged to the Bay (see Chapter 2, *Project Description*, under the heading "Coarse Beach Construction"). In addition, construction would be phased so that the coarse beach is installed first to contain the dredged material and provide sediment control during placement. This would reduce the risk of erosion during construction and prevent erosion, siltation, flooding, and pollution. The required compliance with the Construction General Permit would reduce the potential impacts from construction relative to altering the existing drainage pattern to a **less-than-significant** level.

**Operational**

Upon completion of Project construction, the drainage pattern of the Project site would be substantially changed. If not properly designed and maintained, the Project could result in erosion, siltation, flooding, and exceedance of the stormwater drainage system capacities, or create an additional source of pollution (including sediment).

As discussed in Section 2.1.3, *Goals and Objectives*, the goal of the Proposed Project is to enhance the ecological function of the Tiscornia Marsh and increase flood protection for the Canal neighborhood. The Project would be designed to achieve this goal. To ensure that the

Project achieves this goal and as summarized above in Impact 3.6-1, performance monitoring would be conducted for permit compliance and performance objectives, including the establishment of baseline conditions and monitoring Project performance. Physical monitoring would be conducted at the completion of Project construction and at 1, 3, 5, and 10 years post-construction. Monitoring would include levee crest surveys to identify any areas of excessive settlement or erosion that need to be addressed. Repairs would be implemented, as needed. With compliance with existing regulations and implementation of the performance monitoring activities, impacts associated with altering the existing drainage pattern would be **less than significant**.

**Mitigation:** None required.

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**Impact 3.6-3: The Project could risk the release of pollutants in flood hazard, tsunami, or seiche zones.** ***(Less than Significant)***

**Construction**

As discussed in Section 3.6.1, the Project site is located entirely within the 100-year flood zone, partially within the tsunami hazard zone, and partially within a seiche zone due to its proximity to San Rafael Creek. Pollutants associated with the Project during construction (e.g., fuel, motor oil, sediment) could be released in the event of a flood, tsunami, or seiche.

As discussed in Section 2.1.3, *Goals and Objectives*, the goal of the Proposed Project is to enhance the ecological function of the Tiscornia Marsh and increase flood protection for the Canal neighborhood; the Project would be designed to achieve this goal. As described above in Impact 3.6-1 and Section 2.3, *Project Construction*, the required preparation and implementation of the SWPPP would include BMPs to contain chemicals (e.g., fuel, motor oil) from being released during construction. Erosion control structures (e.g., straw wattles, silt fences) would be installed around staging areas to prevent runon and runoff. Sediment curtains would be installed along the perimeter of the exposed mudflat during low tide to prevent sediment from entering the Bay. All of these measures would be in place during the unlikely event of a flood, tsunami, or seiche. With compliance with existing regulations and implementation of BMPs, impacts relative to flooding, tsunamis, and seiches during construction would be **less than significant**.

**Operation**

As discussed in Section 3.6.1, the Project site is located entirely within the 100-year flood zone, partially within the tsunami hazard zone, and partially within a seiche zone due to its proximity to San Rafael Creek. Pollutants associated with the Project during operation (e.g., sediment) could be released in the event of a flood, tsunami, or seiche.

As discussed in Section 2.1.3, *Goals and Objectives*, the goal of the Proposed Project is to enhance the ecological function of the Tiscornia Marsh and increase flood protection for the Canal neighborhood; the Project would be designed to achieve this goal. Once constructed, the levees would be restored to heights above the BFE, which would reduce the potential for flooding. The restored wetland habitat, jetty, and coarse beach constructed outboard of the levees

would provide additional protection from flooding, tsunamis, and seiches by absorbing much of the energy of such events. The Project site would be designed to be largely self-maintaining after the vegetation has been re-established. As described in Section 2.4, *Operations and Maintenance*, maintenance for the tidal marsh, ecotone slope, and coarse beach during the 3- to 5-year establishment period would include the removal of invasive plants using mechanical means, and the temporary irrigation of ecotone slope plantings. While unlikely, use of localized herbicides would be employed, if highly invasive species become present at the site. In addition, the new and improved flood protection levees and trails would require periodic inspection to identify maintenance and adaptive management needs. At a minimum, levees would be inspected annually to identify any localized settlement, rodent holes, or other conditions that could compromise the levee integrity.

Performance monitoring would be performed as needed for permit compliance and other objectives, including establishing of baseline conditions and monitoring Project performance. Physical and biological monitoring is anticipated to be conducted at the completion of Project construction and at 1, 3, 5, and 10 years post-construction. Monitoring would include levee crest surveys to identify any areas of excessive settlement that need to be addressed. With compliance with existing regulations and implementation of the performance monitoring activities, impacts associated with flooding, tsunamis, and seiches would be **less than significant**.

**Mitigation:** None required.

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**Impact 3.6-4: The Project could conflict with or obstruct the implementation of a water quality control plan or sustainable groundwater management plan. (*Less than Significant*)**

The Proposed Project is not located within a medium or high priority groundwater basin and is therefore not subject to a sustainable groundwater management plan (DWR 2021).

**Construction**

As discussed in Impact 3.6-1 and Section 2.3, *Project Construction*, the Proposed Project would comply with the requirements stipulated in the Construction General Permit. The required preparation and implementation of the SWPPP would include BMPs to prevent pollutants (e.g., fuel, motor oil, sediment) from being released during construction. Erosion control structures (e.g., straw wattles, silt fences) would be installed around staging areas to prevent runon and runoff. Sediment curtains would be installed along the perimeter of the exposed mudflat during low tide to prevent sediment from entering the Bay during construction. These measures would reduce the potential for construction activities to adversely affect water quality, which would make the Project consistent with the Basin Plan. With compliance with existing regulations and implementation of BMPs, impacts relative to the Basin Plan during construction would be **less than significant**.

### Operation

Once constructed, the restored wetland habitat would be largely self-maintaining after the vegetation has been re-established. As described in Section 2.4, *Operations and Maintenance*, maintenance for the tidal marsh, ecotone slope, and coarse beach during the 3- to 5-year establishment period would include the removal of invasive plants using localized herbicides or mechanical means, and the temporary irrigation of ecotone slope plantings. In addition, the new and improved flood protection levees and trails would require periodic inspection to identify maintenance and adaptive management needs. At a minimum, levees would be inspected annually to identify any localized settlement, rodent holes, or other conditions that could compromise the levee integrity.

The performance monitoring activities would be performed as needed for permit compliance and other objectives, including establishing baseline conditions and monitoring Project performance. Physical and biological monitoring is anticipated to be conducted at the completion of Project construction and at 1, 3, 5, and 10 years post-construction. Monitoring would include levee crest surveys to identify any areas of excessive settlement that need to be addressed. As proposed, the Project would function as designed, which would include preventing sediments from being released into the Bay. The Project would be consistent with the Basin Plan during operations, and impacts would be **less than significant**.

**Mitigation:** None required.

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## Cumulative Impacts

This section presents an analysis of the cumulative effects of the Project in combination with other past, present, and reasonably foreseeable future projects that could cause cumulatively considerable impacts. Significant cumulative impacts related to hydrology and water quality could occur if the incremental impacts of the Project combined with the incremental impacts of one or more of the cumulative projects identified in Table 3.1-1.

As previously discussed, the Project would have no impact with respect to groundwater supplies or recharge, or conflicting with a sustainable groundwater management plan. Accordingly, the Project could not contribute to cumulative impacts related to these topics, which are not discussed further.

The geographic scope for cumulative impacts on hydrology and water quality is the immediate Project vicinity and boundaries of San Rafael Bay. The timeframe during which Project could contribute to cumulative hydrology and water quality impacts includes the construction and operation phases. For the Project, the operations phase is permanent.

**Impact 3.6-5: The Project, combined with cumulative development in the Project vicinity, would not result in significant cumulative impacts relative to hydrology or water quality. *(Less than Significant)***

If the Proposed Project and one or more cumulative projects are constructed at the same time, runoff, erosion, and flooding effects could be cumulatively significant if stormwater runoff from

the sites were not controlled. However, the state Construction General Permit would require each project that disturbs 1 or more acres to prepare and implement a SWPPP during construction. The SWPPPs would describe BMPs to control runoff and prevent erosion and flooding for each project. Through compliance with this requirement, runoff and erosion impacts on water quality would be controlled. The Construction General Permit was developed to address cumulative conditions arising from construction throughout the state, and is intended to maintain cumulative effects of projects subject to this requirement below levels that would be considered significant. For example, two adjacent construction sites would be required to implement BMPs to reduce and control the release of sediment and/or other pollutants in any runoff leaving their respective sites. The runoff water from both sites would be required to achieve the same action levels, measured as a maximum amount of sediment or pollutant allowed per unit volume of runoff water. Thus, even if the runoff waters were to combine after leaving the sites, the sediments and/or pollutants in the combined runoff would still be at concentrations (amount of sediment or pollutants per volume of runoff water) below action levels and would not be cumulatively considerable. No significant cumulative impact is identified.

Once constructed, the restored wetland habitat for the Proposed Project would be largely self-maintaining after the vegetation has been re-established. Performance monitoring would ensure that the levees are maintained to prevent erosion and adverse water quality impacts. The cumulative projects listed in Table 3.1-1 all drain into the City's stormwater system. Cumulative projects that do not have properly designed stormwater runoff treatment and controls could cause erosion, and drainage and flooding problems that could adversely affect water quality, including that of San Rafael Creek and ultimately San Rafael Bay, which the Proposed Project and the cumulative projects would all drain into. However, all cumulative projects with stormwater runoff that would drain into the City's stormwater system would be required to comply with the SWRCB Stormwater NPDES Permit for small municipal separate storm sewer systems (also known as MS4s), including Provision E.12, *Post-Construction Stormwater Management Program*. This provision mandates municipalities to require specified features and facilities to control pollutant sources; control runoff volumes, rates, and durations; and to treat runoff before discharge from the site. The provision also requires that these measures be included in development plans as conditions of issuing approvals and permits.

With funding from the North Bay Watershed Association (NBWA) and support from the NBWA Joint Technical Committee, the Bay Area Stormwater Management Agencies Association (BASMAA), through the BASMAA Phase II Committee, created the *BASMAA Post-Construction Manual, Design Guidance for Stormwater Treatment and Control for Projects in Marin, Sonoma, Napa, And Solano Counties: A Low Impact Development Approach to Implementing Provision E.12 of the Phase II Small MS4 General Permit* (BASMAA 2019). The Post-Construction Manual assists project applicants in implementing measures that demonstrate that their project complies with the NPDES permit requirements by providing guidance for applicant stormwater control plans and Low-Impact Development (LID) design. With compliance with MS4 requirements, the operation of the Proposed Project and cumulative projects would not have a cumulatively considerable contribution to the cumulative impact on water quality. **No significant cumulative impacts are identified.**

**Mitigation:** None required.

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## 3.6.4 References

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