



**Waste Management Unit
Restoration Project**

Initial Study Mitigated Negative Declaration

September 2025

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Appendix B Air Quality Modeling Outputs and Energy Calculations, prepared by Stantec Consulting Services Inc., 2023
Appendix C Special Status Species Summary, prepared by WRA, 2021
Appendix D WMU 32 Closure Concept Changes Impact Assessment Memorandum, prepared by WRA, 2023; Biological Opinion, prepared by the U.S. Fish and Wildlife Service, 2017
Appendix E Notification of Project and Consultation Opportunity for Native American Tribes, prepared by Regional Water Quality Control Board, 2018
Appendix F Noise Technical Memorandum, prepared by Stantec Consulting Services Inc., 2023
Appendix G Traffic Impact Study, prepared by Stantec Consulting Services Inc., 2023



Appendix H Health Risk Modeling Report, prepared by Geosyntec Consultants,
2023



Acronyms and Abbreviations

3008(h) Order	U.S. Environmental Protection Agency Resource Conservation and Recovery Act Administrative Order No. 09-89-0013 3008(h)
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ADT	average daily trips
Applicant	Avon Remediation Team
AQP	air quality plan
BAAQMD	Bay Area Air Quality Management District
bgs	below ground surface
BMPs	best management practices
cal	calibrated
CAL FIRE	California Department of Forestry and Fire Protection
CalEEMod	California Emissions Estimator Model
CalGreen	California Green Building Standards Code
Caltrans	California Department of Transportation
CAP	Climate Action Plan
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CCCFPD	Contra Costa County Fire Protection District
CCR	California Code of Regulations
CCWD	Contra Costa Water District
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CGP	State Water Resources Control Board NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities (Construction Stormwater General Permit) (Order WQ 2022-057-DWQ)
CNDDB	California Department of Fish and Wildlife Natural Diversity Database
CNPS	California Native Plant Society
County	Contra Costa County, California
County ISMND	Contra Costa County Public Works Department Initial Study of Environmental Significance for the Lower Walnut Creek Restoration Project
CPCMP	Closure and Post-Closure Maintenance Plans
CRR	California Ridgway's Rail
CWA	Clean Water Act
CWC	Clean Water Canal
dB(A)	decibels (A-weighted)
DOC	California Department of Conservation
DPM	diesel particulate matter
DTSC	California Department of Toxic Substances and Control
EBRPD	East Bay Regional Park District
EIR	Environmental Impact Report
EO	Executive Order
EPS	expanded polystyrene
ESA	Environmental Site Assessment
ESO	Emergency Services Organization
Facility	Martinez Renewable Fuels Facility



FMMP	Farmland Mapping and Monitoring Program
GHG	greenhouse gas
HASP	Health and Safety Plan
HDPE	High-density polyethylene geomembrane
HMMP	Habitat Mitigation and Monitoring Plan
HRA	Health Risk Assessment
I-680	Interstate 680
IPCC	Intergovernmental Panel on Climate Change
ISMND	Initial Study Mitigated Negative Declaration
lbs/day	pounds per day
Leq	Equivalent Average Noise Level
LFG	landfill gas
LLDPE	Linear low-density polyethylene
MGD	million gallons per day
MMTCO _{2e}	million metric tons of carbon dioxide equivalent
MRZ	Mineral Resource Zone
msl	mean sea level
NAHC	Native American Heritage Commission
NMOCs	Non-methane organic compounds
NPDES	National Pollutant Discharge Elimination System
NWIC	Northwest Information Center
OEHHA	Office of Environmental Health Hazard Assessment
OSHA	Occupational Safety and Health Administration
OSP	Oily Skim Pond
PG&E	Pacific Gas and Electric
PG&E	Pacific Gas and Electric
PM ₁₀	particulate matter 10 microns or less in diameter
PPE	personal protective equipment
PPV	peak particle velocity
PRC	Public Resources Code
PROJECT	Waste Management Unit Restoration Project
PROJECT WMUs	WMUs 10/11/14, 31 and 32
RCRA	Resource Conservation and Recovery Act
ROG	reactive organic gas
R&Sis	Rules & Standing Instructions
SB	Senate Bill
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SMHM	salt marsh harvest mouse
SR	State Route
SVP	Society for Vertebrate Paleontology
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TAC	Toxic Air Contaminants
TCR	Tribal Cultural Resource
TMP	Traffic Management Plan
UCMP	University of California, Berkeley's Museum of Paleontology
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture



USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VMT	vehicle miles travelled
WDR ORDER	Waste Discharge Requirements Order No. R2-2004-0056
WMU	Waste Management Unit
WRA	WRA, Inc.
YBM	Young Bay Mud



INITIAL STUDY MITIGATED NEGATIVE DECLARATION

Project Title: Waste Management Unit Restoration Project

Project Description: The Avon Remediation Team is proposing completion of the Waste Management Unit Restoration Project (PROJECT) at the Martinez Renewable Fuels Facility (Facility) in Contra Costa County, California. The PROJECT would involve the closure of inactive Waste Management Units 10/11/14, 31, and 32 (PROJECT WMUs) and mitigation and maintenance of the PROJECT WMUs.

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Determination: The San Francisco Bay Regional Water Quality Control Board has determined that a) all potentially significant or significant impacts identified in the Initial Study Mitigated Negative Declaration (ISMND) have been identified and analyzed; and b) with respect to each significant impact on the environment, either of the following apply: 1) changes or alterations have been required or incorporated into the project that avoid or mitigate the significant impacts to a level of less than significant; or 2) those changes or alterations that are within the responsibility and jurisdiction of another public agency and have been, or can and should be, adopted by that other agency. The ISMND and supporting documents are available at the San Francisco Bay Regional Water Quality Control Board, located at 1515 Clay St., Suite 1400, Oakland, California 94612.

By: _____

Date: _____

Katie Hart, PE, Staff



1.0 INTRODUCTION

The Avon Remediation Team (Applicant) is proposing completion of the Waste Management Unit Restoration Project (PROJECT) at the Martinez Renewable Fuels Facility (Facility) in Contra Costa County, California (County). The PROJECT would involve the closure of inactive Waste Management Units 10/11/14, 31, and 32 (PROJECT WMUs) and mitigation and maintenance of the PROJECT WMUs.

1.1 PROJECT TITLE

Waste Management Unit Restoration Project

1.2 PURPOSE

The purpose of the PROJECT is to satisfy the regulatory requirements of the San Francisco Regional Water Quality Control Board (SFBRWQCB) Waste Discharge Requirements Order No. R2-2004-0056 (WDR ORDER) and the U.S. Environmental Protection Agency (USEPA) Resource Conservation and Recovery Act Administrative Order No. 09-89-0013 3008(h) (3008(h) Order).

This ISMND has been prepared in accordance with California Environmental Quality Act (CEQA), Public Resources Code (PRC) Section 21000 et seq., and the CEQA Guidelines, California Code of Regulations (CCR), Title 14, Section 15000 et seq. The SFBRWQCB is the lead agency under CEQA and has the principal responsibility for carrying out or approving a project which may have a significant effect on the environment.

1.3 PROJECT LOCATION

The PROJECT WMUs are located on Facility-owned property. The PROJECT site is approximately two miles east of the Benicia-Martinez Bridge and Interstate 680 (I-680) along Waterfront Road.

1.4 SITE HISTORY

Active refining of petroleum products was terminated in 2020 and the transition from active refining of petroleum production to production of renewable fuels was completed in 2023. Before the 1980s, the Facility conducted several waste treatments, storage, and/or disposal operations in areas referred to as “solid waste management units.” In 1989, the USEPA issued the 3008(h) Order requiring appropriate risk-based “corrective action” of several Waste Management Units (WMUs) at the Facility, including the timely closure of the PROJECT WMUs. Since 2004, the SFBRWQCB has authorized the closure of 10 other WMUs at the Facility.

1.5 EXISTING SITE CONDITIONS

The PROJECT WMUs are located within an industrial area of the Facility that has been previously disturbed to support Facility operations. The PROJECT WMUs consist of low-lying broad basins with bermed perimeters constructed from native soil and fill, created for the disposal of waste material. Wastes deposited and/or treated at the PROJECT WMUs consisted of oily wastes ranging from asphaltic semi-solids to liquids and sludges, and in the case of WMU 31, locally generated dredged sediments. Waste containing sulfuric acid was disposed in the south-central portion of WMU 32.



After the PROJECT WMUs became inactive, precipitation caused ponding within the cells, the soil and waste subsided, and the WMUs became overgrown with vegetation. The wetlands that subsequently formed within the WMUs are not remnant original bay wetlands; rather the wetlands formed within the berms of the WMUs following cessation of active waste management. The PROJECT WMUs provided low-quality substrate on which vegetation became established. Although the wetland features have low function and value, the features meet the criteria for defining jurisdictional wetlands pursuant to Clean Water Act (CWA) regulations.

1.6 SURROUNDING LAND USES

The PROJECT WMUs are located in the northern portion of the Facility and are surrounded by Facility industrial infrastructure to the west, refinery industrial infrastructure to the south, the Carquinez Strait and Suisun Bay to the north, and the Point Edith Wildlife Area to the east (Figure 2-2).

The County General Plan designations and zoning districts are listed in Table 1.6-1 for each PROJECT component.

Table 1.6-1. General Plan Designation and Zoning District

PROJECT Component	General Plan Designation	Zoning
WMU 10/11/14	Heavy Industrial	Heavy Industrial
WMU 31	Open Space	Heavy Industrial
WMU 32	Heavy Industrial	Heavy Industrial

Source: Contra Costa County 2021.

Uses permitted in the Heavy Industrial zoning district include, but are not limited to, the manufacturing or processing of petroleum, lumber, steel, chemicals, explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products (Contra Costa County 2021).

1.7 CEQA PUBLIC AND AGENCY REVIEW

CEQA requires state and local government agencies to disclose the potential significant impacts to the environment from proposed projects, and to reduce those impacts to the extent feasible. The intent of CEQA is to foster good planning and to consider environmental issues during the planning process. The SFBRWQCB is the lead agency under CEQA for the preparation of this ISMND. The CEQA Guidelines (Section 21067) define the lead agency as: “the public agency which has the principal responsibility for carrying out or approving a project which may have a significant effect upon the environment.” Approval of the PROJECT is considered a public agency discretionary action, and therefore subject to CEQA.

The purpose of this document is to inform the decision makers and the public about the potential environmental impacts of implementing the PROJECT. The public, County residents, and other local and State resource agencies will be given the opportunity to review and comment on this document during a 30-day public-review period. Comments received during the review period will be considered by the SFBRWQCB prior to certification of this ISMND and PROJECT approval.



1.8 REQUIRED PERMITS AND APPROVALS

Approvals/actions for the PROJECT may include, but are not limited to:

- CWA, Section 404 Individual permit
- Rivers and Harbors Act, Section 10 Letter of Permission
- CWA, Section 401 Water Quality Certification
- CWA, Section 402, General Construction Storm Water Discharge Permit
- Environmental Species Act, Incidental Take Statement
- Bay Conservation and Development Commission (BCDC), Major Permit (McAteer-Petris Act)
- Contra Costa County Grading permit
- Contra Costa County Building permit
- Bay Area Air Quality Management District (BAAQMD) Construction Notification
- BAAQMD Authority to Construct/Permit to Operate
- SFBRWQCB, Closure Plan

1.9 SCOPE OF THIS ISMND

As the lead agency under CEQA, the SFBRWQCB is responsible for compliance with the environmental review process prescribed by the CEQA. This ISMND focuses on the environmental issues identified as potentially significant in the CEQA checklist. This ISMND evaluates the potentially significant effects on the environment and identifies revisions in the PROJECT site plans (presented as mitigation measures) to mitigate the effects to a level at which no significant effect on the environment would occur. A complete project description is included in Section 2.0, Project Description. Section 3.0, Construction Methods, includes a description of the PROJECT construction and grading activities and components. Mitigation and maintenance activities are described in Section 4.0, Operation and Maintenance Activities, Evaluations of the CEQA Appendix G checklist questions are analyzed in Section 5.0, Environmental Checklist and Environmental Evaluation, references are included in Section 6.0, References, and a list of preparers is included in Section 7.0. List of Preparers, of this document.

The following technical studies listed below were conducted and/or reviewed in preparing this ISMND. These technical studies are referred to, where appropriate, throughout this document and are attached as appendices:

- Construction and Grading Assumptions, prepared by Stantec Consulting Services Inc. 2023 (Appendix A);
- Air Quality Modeling Outputs, prepared by Stantec Consulting Services Inc. 2023 (Appendix B);
- Special Status Species Summary, prepared by WRA, Inc. (WRA) 2018 (Appendix C);
- WMU 32 Closure Concept Changes Impact Assessment Memorandum, prepared by WRA 2023; Biological Opinion, prepared by the U.S. Fish and Wildlife Service 2017 (Appendix D);
- Notification of Project and Consultation Opportunity for Native American Tribes, prepared by Regional Water Quality Control Board. 2018 (Appendix E);
- Noise Technical Memorandum, prepared by Stantec Consulting Services Inc. 2023 (Appendix F);
- Traffic Impact Study, prepared by Stantec Consulting Services Inc. 2023 (Appendix G); and
- Health Risk Modeling Report, prepared by Geosyntec Consultants 2023 (Appendix H).



1.10 DOCUMENT ORGANIZATION

This ISMND is organized as follows:

Section 1.0: Introduction. This section introduces the PROJECT and describes the purpose and organization of this document.

Section 2.0: Project Description. This section provides a detailed description of the PROJECT.

Section 3.0: Construction Methods. This section includes a description of the construction and grading activities and components of the PROJECT.

Section 4.0: Operation and Maintenance Activities. This section provides a detailed description of the post-closure activities of the PROJECT.

Section 5.0: Environmental Checklist and Environmental Evaluation. This section presents an analysis of the range of environmental issues identified in the CEQA Environmental Checklist and determines for each topic whether the PROJECT would result in no impact, a less than significant impact, a less than significant impact with mitigation incorporated, or a potentially significant impact. If impacts are determined to be potentially significant after incorporation of applicable mitigation measures, an Environmental Impact Report (EIR) would be required. For this PROJECT, however, mitigation measures have been incorporated, where needed, to reduce all potentially significant impacts to a less than significant level.

Section 6.0: References. This section lists the references used in preparing this ISMND.

Section 7.0: List of Preparers. This section identifies the report preparers.



2.0 PROJECT DESCRIPTION

2.1 PROJECT OVERVIEW

The PROJECT is located at the Facility in Contra Costa County, California (Figure 2-1). The PROJECT would involve the closure of the PROJECT WMUs and mitigation and maintenance of the PROJECT WMUs.

2.2 PROJECT OBJECTIVES

The PROJECT has been designed to meet the following objectives:

- To satisfy closure requirements of the WDR ORDER and corrective action requirements of the 3008(h) Order.
- To avoid and minimize impacts to wetlands and habitat for species listed as threatened or endangered under the Federal Endangered Species Act and the California Endangered Species Act.
- To ensure closure activities can be safely implemented, operated, and maintained in a manner consistent with ongoing Facility operations.

2.3 PROJECT COMPONENTS

The proposed construction and grading methods and mitigation and maintenance activities discussed in the following paragraphs were selected to reduce impacts to sensitive resources including jurisdictional waters and endangered species habitat to the maximum extent practicable. The location of each PROJECT component is shown in Figure 2-2 through Figure 2-5. Construction and grading assumptions of each PROJECT component are presented in Appendix A.

2.3.1 Closure of PROJECT WMUs

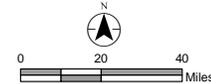
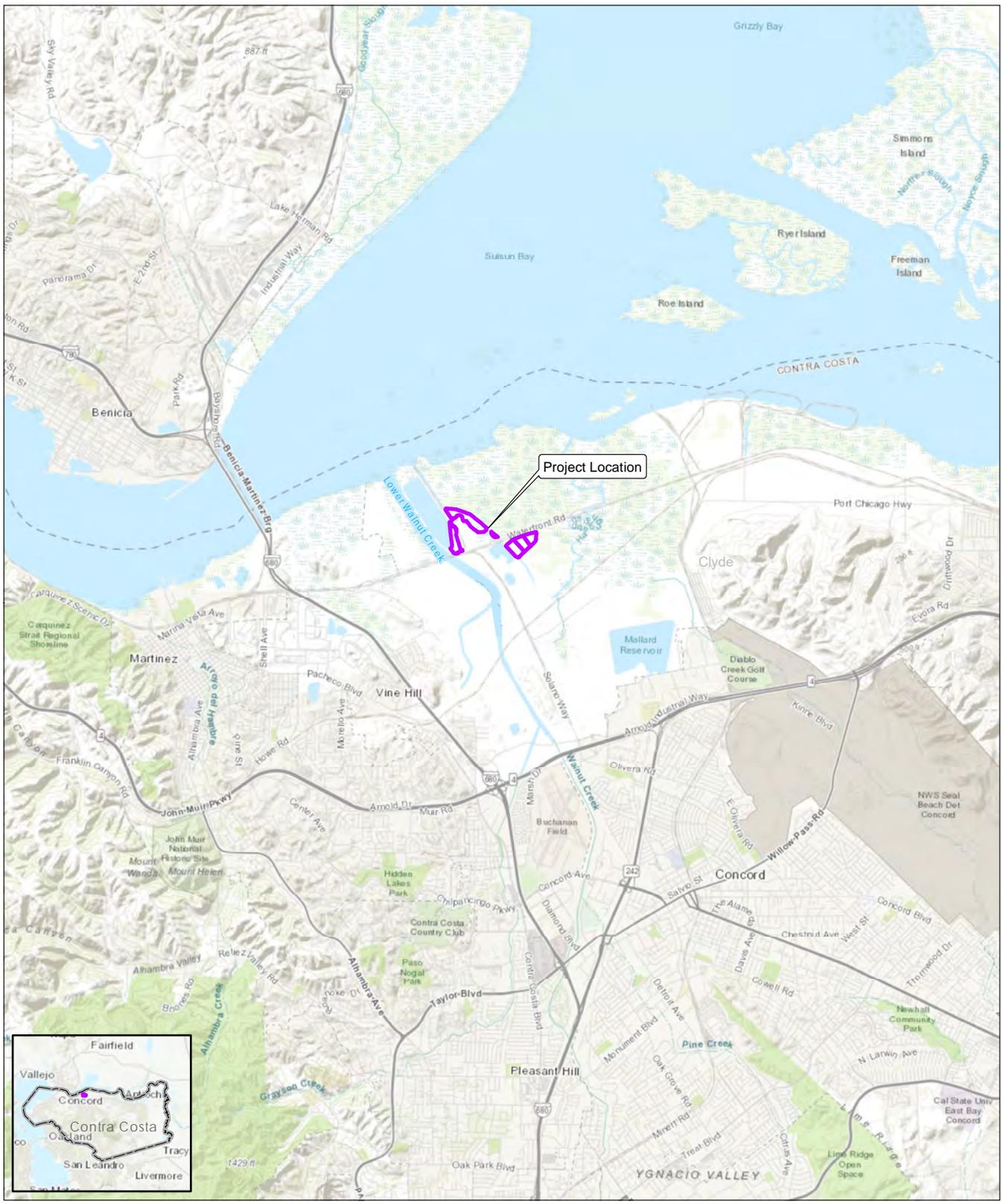
WMUs 10/11/14 – Waste Excavation and Restoration at WMUs 10 and 11; and Perimeter Berm Improvements, Waste Consolidation and Title 27 Compliant Cover at WMU 14

Closure at WMUs 10/11/14 involves the construction of a consolidation cell in the footprint of WMU 14, excavating waste material from WMUs 10 and 11 and placing the excavated waste into the WMU 14 Consolidation Cell, and installing a cover system.

The excavated areas at WMUs 10 and 11 would be backfilled with clean soil and revegetated to restore the impacted wetlands and wildlife habitat in accordance with the implementation, monitoring, and management activities prescribed in the PROJECT Habitat Mitigation and Monitoring Plan (HMMP).

Estimated excavation, backfill, and grading volumes for the WMUs 10/11/14 construction activities are presented in Table 2.3-1. The WMU 10/11/14 sites are depicted in Figure 2-3. Detailed closure assumptions are presented in Appendix A. The design shall meet applicable building codes, Title 27 requirements, and consider sea level rise projections available at the time of Closure Plan submittal.





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Waste Management Unit Restoration Project
Figure 2-1: Regional Overview

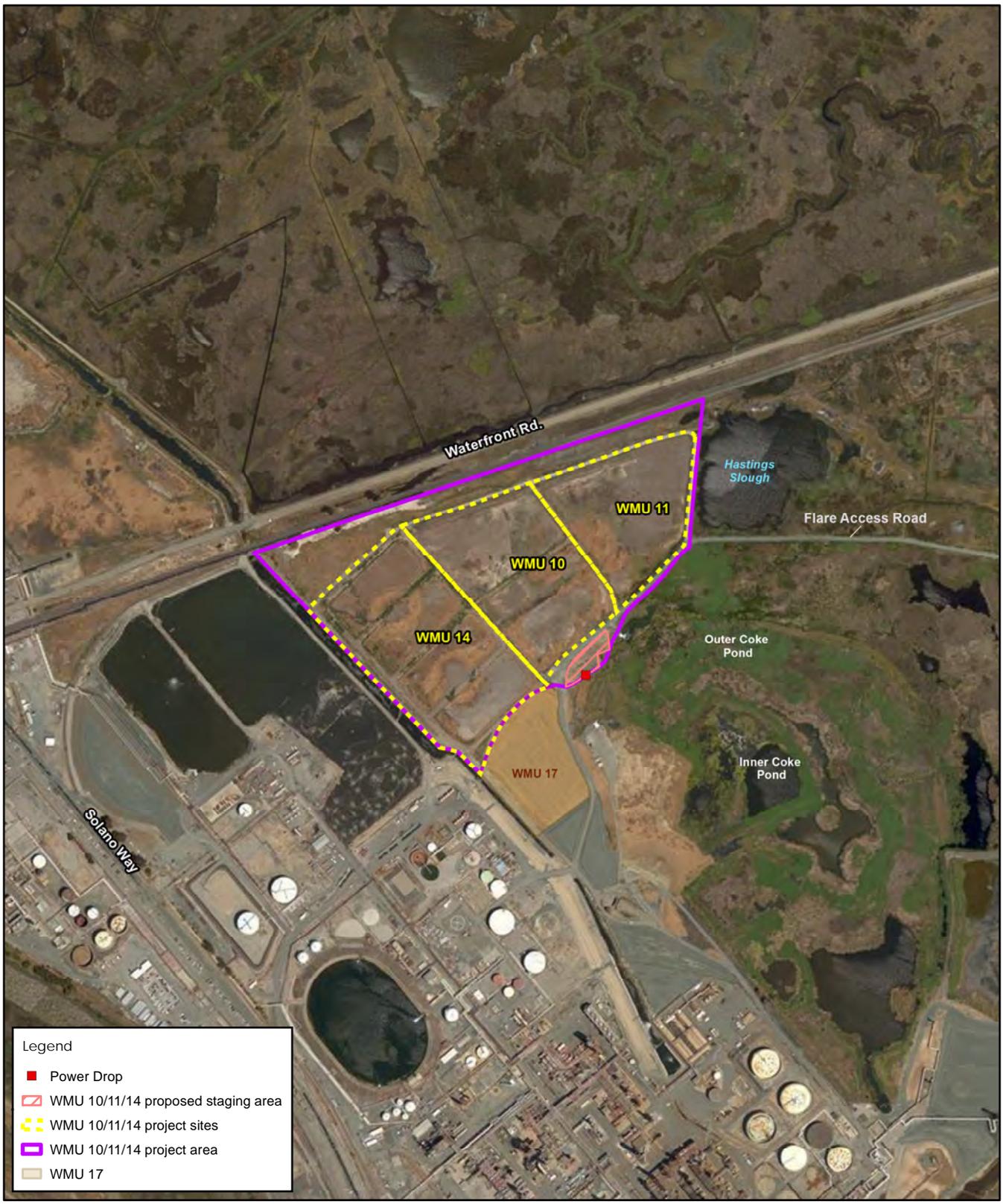


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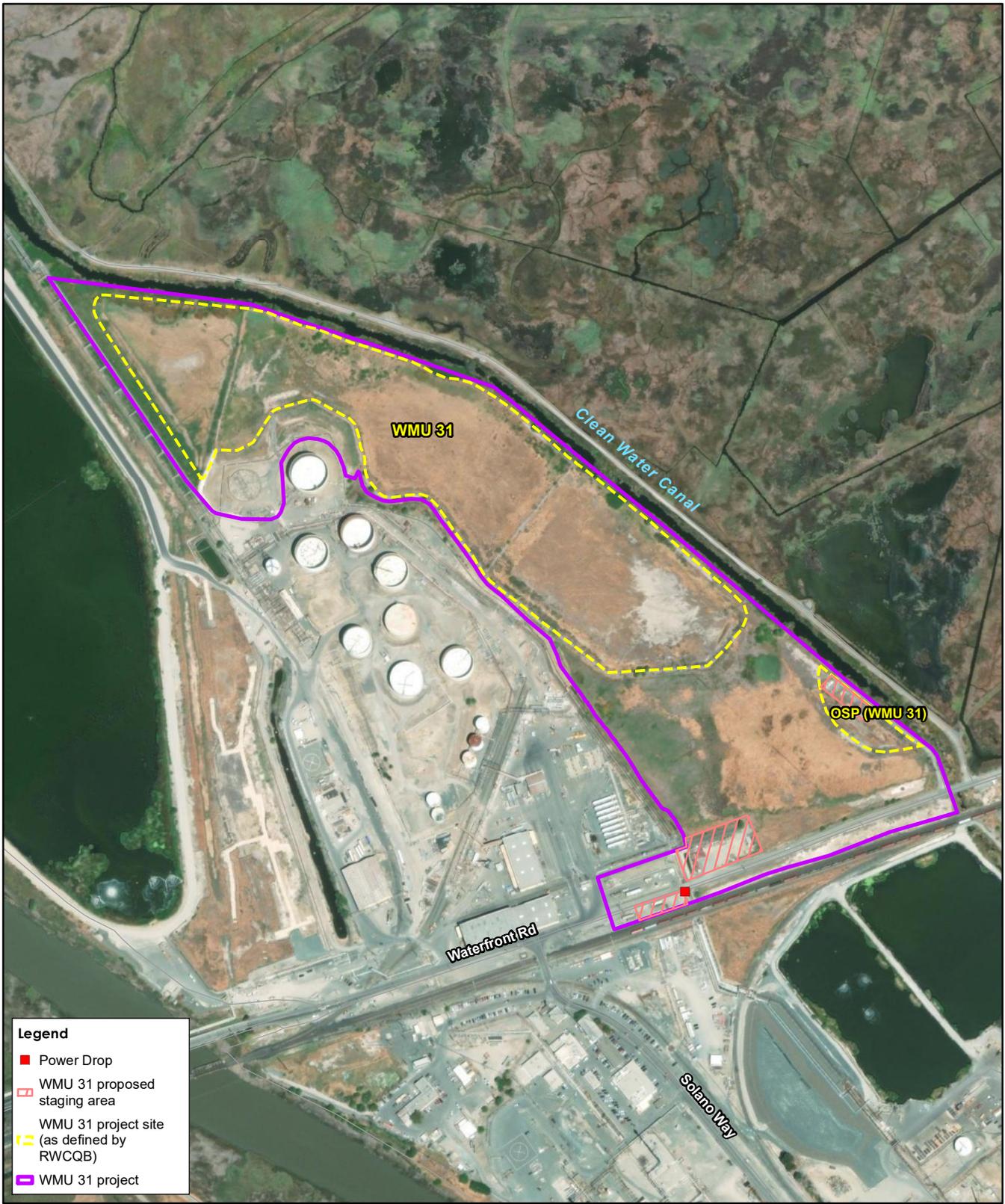
Figure 2-2: WMU Project Areas



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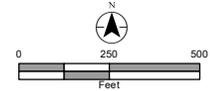


Waste Management Unit Restoration Project
Figure 2-3: WMU 10/11/14 Project Sites



Legend

- Power Drop
- ▨ WMU 31 proposed staging area
- ▭ WMU 31 project site (as defined by RWCQB)
- ▭ WMU 31 project



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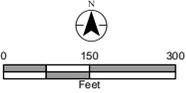
Waste Management Unit Restoration Project

Figure 2-4: WMU 31 Project Site



Legend

- Power Drop
- ▨ WMU 32 potential staging area
- ▭ WMU 32 project site (as defined by RWQCB)
- ▭ WMU 32 project area



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Waste Management Unit Restoration Project

Figure 2-5: WMU 32 Project Site

WMU 31 – Waste Excavation and Consolidation at WMU 14 Consolidation Cell

Closure at WMU 31 involves excavating and consolidating the waste material into the WMU 14 Consolidation Cell. Additionally, waste excavated from the WMU 31 Oily Skim Pond would be treated and transported to the WMU 14 Consolidation Cell.

The excavated areas at WMU 31 would be backfilled with clean soil and revegetated to restore the impacted wetlands and wildlife habitat in accordance with the HMMP. Estimated excavation, backfill, and grading volumes for the WMU 31 construction activities are presented in Table 2.3-1. The WMU 31 site is depicted in Figure 2-4. Detailed closure assumptions are presented in Appendix A. The design shall meet applicable building codes, Title 27 requirements, and consider sea level rise projections available at the time of Closure Plan submittal.

WMU 32 – Title 27 Compliant Cover

Closure at WMU 32 involves placement of a Title 27 compliant cover system, consisting of a combination of ground surface and elevated structural (metal) elements, over approximately 11.5 acres of existing surface and subsurface waste material. The elevated structure could cover up to approximately 11.5 acres at an elevation of approximately 20 to 30 feet above the existing ground surface. The structure is anticipated to have a solid roof, open sides, and a perimeter fencing system (consisting of chain link fence, solid wildlife exclusion fencing, and bird-deterrent mesh) to exclude human and fauna entrance into the covered footprint. The elevated structure is an unoccupied space and is categorized as a risk category I facility (defined as building or structure that represents a low hazard to human life in the event of failure). Access to the structure is by exception only for emergency, inspection, and repair personnel. Excavation, backfill, and grading volumes for the WMU 32 construction activities are presented in Table 2.3-1. The WMU 32 site is depicted in Figure 2-5. Detailed closure assumptions are presented in Appendix A. The design shall meet applicable building codes, Title 27 requirements, and consider sea level rise projections available at the time of Closure Plan submittal. The WMU 32 elevated structural cover will be designed such that an additional dead load of 5 pounds per square foot can be added on top of the roof surface for the potential addition of solar panels at the discretion of the Facility. However, the installation and use of solar panels is not considered at this time.

WMU 14 – Perimeter Berms

The berms at the perimeter of WMU 14 shall meet applicable Title 27 requirements and meet sea level risk height projections available at the time of Closure Plan submittal.

Wetland Impacts and Mitigation

Excavation and cover of wetlands during closure of the PROJECT WMUs would result in permanent impacts to 27.05 acres of jurisdictional waters. The 18.58 acres of impacted area located in WMUs 10, 11 and 31 would be restored¹ (re-established) within these WMU areas following closure activities, so losses would be temporal in nature. The 8.47 acres of impacted area within WMUs 14 and 32 will be permanently lost due to construction of Title 27 covers. To offset the wetland impacts the Applicant will restore wetlands onsite, has acquired and completed grading on, and dedication of a property referred to here as the Suisun Properties land to the John Muir Land Trust for incorporation into the Lower Walnut Creek Restoration Project (Restoration Project), and has purchased 8.47 acres of wetland credits at Wildland's North Suisun Mitigation Bank. The offsite Suisun Properties parcel is a 19-acre site that abuts the Suisun Bay and is adjacent to the site for the Lower Walnut Creek Restoration Project, a watershed enhancement project developed in partnership between the John Muir Land Trust and the Contra Costa County Flood Control and Water Conservation District. The impacts associated with the initial grading of the Suisun Properties and the

¹ Success criteria for the restored wetlands shall be defined as part of compliance with Mitigation Measure BIO 7. See Section 5.4, Biological Resources, of this ISMND.



Restoration Project were analyzed in the Contra Costa County Public Works Department Initial Study of Environmental Significance for the Lower Walnut Creek Restoration Project (Project Number 7520-6B-8285 (County ISMND)).

Special Status Species Impacts and Mitigation

Closure of the PROJECT WMUs would result in temporary impacts to 5.46 acres of Salt Marsh Harvest Mouse (SMHM) wetland habitat and 19.18 acres of SMHM upland habitat; these impacts would be restored to pre-project conditions within 24 months following the initial disturbance. A total of 2.96 acres of SMHM wetland habitat and 8.31 acres of seasonal SMHM upland habitat would be permanently impacted. To offset the temporary and permanent impacts to SMHM habitat, the Applicant would ensure the preservation and management of 83.09 acres of SMHM habitat at the established Cordelia Slough Preserve, as approved by the U.S. Fish and Wildlife Service (USFWS).

Table 2.3-1 presents a summary of excavation, backfill, and grading volumes associated with the PROJECT activities described above.

Table 2.3-1. Excavation, Backfill, and Grading Volumes

PROJECT Component	Site Preparation	Excavation	Backfill
Waste Removal			
WMUs 10/11/14	100,000 CY* perimeter stabilization (50,000 CY excavated; 50,000 CY slurry backfilled)	180,800 CY	123,700 CY
WMU 31	10,000 CY	274,500 CY	274,500 CY
WMU 32	2,500 CY shallow impacted soil (existing soil grading and leveling that does not leave the site), 500 CY of soil removed from the site	500 CY (shallow impacted soil removed from the perimeter of the site for fencing installation)	0
Access Road Grading			
WMUs 10/11/14	0	0	7,500 CY
WMU 31	0	0	15,000 CY
WMU 32	3,000 CY	0	0
Staging Area Grading			
WMUs 10/11/14	0	5,000 CY	5,000 CY
WMU 31	0	5,000 CY	5,000 CY
WMU 32	1,000 CY	0	0
Restoration			
WMUs 10/11/14	0	0	0
WMU 31	0	0	0
WMU 32	0	0	5,000 CY of gravel for grading within WMU 32 and below piperacks.
Total	116,500 CY rounded to 117,000 CY)	465,800 CY (rounded to 466,000 CY)	435,700 CY (rounded to 436,000 CY)

Note: * CY = cubic yard



3.0 CONSTRUCTION METHODS

3.1 CLOSURE SCHEDULE

WMU closure construction would be conducted over the course of eight years with construction expected to start in 2024 and end in 2031. The anticipated closure schedule is as follows:

- Year 1 – Construct WMU 14 Consolidation Cell.
- Year 2 – Excavate WMU 10/11 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 10/11 wetland/habitat.
- Year 3 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat.
- Year 4 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat.
- Year 5 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat.
- Year 6 – Construct WMU 14 Consolidation Cell cover.
- Years 7 and 8 – Construct WMU 32 Title 27 Compliant Cover.

Construction would employ a crew of approximately 75 workers at any given time.

3.2 CONSTRUCTION ACTIVITIES

3.2.1 Site Preparation

Prior to PROJECT excavation activities construction areas would be grubbed to remove rocks, vegetation, and debris using methods to avoid impacts to listed species described in the Biological Opinion issued by the USFWS (U.S. Army Corps of Engineers [USACE] file number 2008-0083S) for the PROJECT (Appendix D). Monitoring wells located within the work area would be destroyed in accordance with County well destruction requirements. Utilities and pipelines would be relocated/removed, dependent on the closure area of the PROJECT. For example, the existing stormwater control pipes along the interior berms of WMUs 10/11/14 would be removed. In addition, other pipelines within the proposed disturbance areas may require work. Best management practices (BMPs) would be implemented to minimize erosion and sedimentation. Possible BMPs include, but are not limited to, silt fencing, straw wattles, and watering. Access to the PROJECT components would be controlled by temporary fencing or similar methods.

The PROJECT is anticipated to require a total of approximately 300,000,000 gallons of water during the site preparation and closure construction phases for soil conditioning, dust control, odor control, among other uses. Water would be obtained from the on-site fire water system (valve or hydrant). BMPs would be implemented to handle construction waste.

3.2.2 Staging Areas

All equipment, materials, equipment refueling, dewatering/treatment/discharge, and field trailers would be stored and/or take place at temporary staging areas. The anticipated staging areas associated with PROJECT WMUs are presented on Figure 2-3 through Figure 2-5.



3.2.3 Project Disturbance

The PROJECT would temporarily disturb approximately 122 acres and permanently disturb 42 acres of the PROJECT site. The temporary and permanent disturbance areas for each PROJECT component are summarized in Table 3.2-1.

Table 3.2-1. PROJECT Disturbance Areas

PROJECT Component	Permanent Disturbance		Temporary Disturbance	
Closure of PROJECT WMUs				
WMUs 10/11/14				
Access Roads	3.5 acres	152,460 square feet	2.3 acres (5,000 linear feet x 20 feet wide)	100,000 square feet
Staging Areas	1 acre	43,560 square feet	0	0
PROJECT Closure Construction	10 acres (WMU 14 would be fully disturbed for construction of consolidation cell)	435,600 square feet	22 acres	958,320 square feet
Restoration Activities	10 acres	435,600 square feet	22 acres	958,320 square feet
WMU 31				
Access Roads	0	0	6 acres (10,000 linear feet x 26 feet wide)	260,000 square feet
Staging Areas	1 acre	43,560 square feet	2 acres (existing gravel and asphalt areas)	87,120 square feet
PROJECT Closure Construction	2 acres (oily skim pond area)	87,120 square feet	28 acres	1,219,680 square feet
Restoration Activities	2 acres	87,120 square feet	28 acres	1,219,680 square feet
WMU 32				
Access Roads	0	0	3 acres (5,000 linear feet x 26 feet wide of existing roads)	130,000 square feet
Staging Areas	0	0	4.5 acres (existing gravel and asphalt areas)	196,020 square feet
PROJECT Closure Construction	11.5 acres (vegetation) and 1 acre (work surface)	544,500 square feet	0	0
Restoration Activities	0	0	4.5 acres (staging areas)	196,020 square feet
PROJECT Total	42 acres	1,830,000 square feet	122.3 acres (rounded 122 acres)	5,325,000 square feet



3.2.4 Stockpiling

Clearing and grubbing materials at the PROJECT WMUs would be temporarily stockpiled within the PROJECT WMUs and/or associated staging areas prior to loading onto trucks for off-haul and disposal. Generally, stockpiles of clean material would be incorporated into restoration areas and stockpiles of contaminated material would be consolidated into the WMU 14 Consolidation Cell. Due to the order of proposed construction, excavation materials from WMU 32 would be prevented from being consolidated into the WMU 14 Consolidation Cell. Excavated materials from WMU 32 would be self-consolidated to the extent feasible, but it may not be possible for all excavated materials to self-consolidate. Therefore, it is estimated that approximately 500 CY of contaminated materials would be disposed of off-site.

3.2.5 Construction Equipment

Standard construction equipment would be used during the PROJECT activities described above.

Access to the Facility for construction personnel and construction deliveries would be through controlled facility access points, typically through the North Gate on Waterfront Road, South Gate on Solano Way, or East Gate on Bates Avenue. The access roads would be maintained, as needed, to facilitate on-site circulation for emergency vehicles during all weather conditions. Materials for construction of the PROJECT are anticipated to be delivered by truck, though it is also possible that deliveries could be received as part of standard Facility railway operations. All truck traffic would occur on designated truck routes and major streets. Deliveries of construction materials are anticipated to come from less than approximately 50 miles on average and vehicles would utilize fully surfaced regional transportation routes: from I-680 to Waterfront Road, I-680 to Highway 4 to Solano Way, or I-680 to Port Chicago Highway to Bates Avenue. During Year 1, deliveries (e.g., rock, asphalt, gravel, etc.) would be made on tractor trailer trucks coming from Clear Lake (Lake County) and Dixon (Solano County). During Year 6, gravel would be hauled in on tractor trailer trucks coming from Lake Herman Quarry (Solano County). Structural metal and geosynthetic material deliveries are anticipated to come from greater than approximately 200 miles. Mileages used within the analysis are provided in Appendix B.

Construction traffic exiting the Facility would travel out the North Gate on Waterfront Road, South Gate on Solano Way, or East Gate on Bates Avenue to access other points in the County. Traffic from construction activities would be temporary and would occur along existing roadways as workers and materials are transported to and from the PROJECT site. Approximately 25,000 truck trips are assumed for construction-related deliveries over the 8-year construction period, ranging from 600 to 16,100 trips per year. Following construction activities, access roads would be restored to respective pre-construction conditions.

3.2.6 Utilities

Portions of the PROJECT construction activities would require power and/or water. Closure activities at WMUs 10/11/14 would use an existing power supply at the south end of the WMUs 10/11/14 staging area. Fire water hydrants located at the WMUs 10/11/14 staging area would be used for construction activities requiring water such as, ground improvement and dust and odor control. The WMU 31 staging area south of Waterfront Road would include a power drop from the existing powerlines while water would be provided from fire line connection points. The WMU 32 staging area north of Waterfront Road and east of the West Canal would use power drops from existing powerlines while water would be provided from fire line connection points.



3.2.7 Odor Management

Odors may be generated during the closure of the PROJECT WMUs due to the nature of the waste units. Onsite odor monitoring will be conducted routinely to proactively identify and manage potential odors to minimize migration off of the property. Odor reduction measures will be implemented as needed throughout construction at PROJECT WMUs and may include, but would not be limited to, application of odor suppressants (ODEX or other odor control liquid), odor suppressant foam application, and/or plastic sheeting to cover soil stockpiles or active excavation faces during excavation and soil handling. The specific equipment utilized to monitor and minimize odors may vary over the course of the PROJECT depending on specific work conditions or the availability of new technology. The PROJECT site has the size and capacity to add equipment necessary to control odor. Application of odor suppressants would likely occur downwind of the PROJECT site, within the area of work. Odor suppressant foam may be applied to the ground surface being disturbed if odors are not sufficiently reduced by application of odor suppressants.

Additional details regarding odor management will be incorporated in an odor control plan for the PROJECT, which will be developed prior to beginning construction. The odor control plan will comply with requirements included in the BAAQMD permit.

3.2.8 Wastewater Management

Wastewater is not anticipated to be generated during PROJECT construction. However, in the event that wastewater is generated from groundwater dewatering to facilitate excavation, stormwater, dust, odor suppression liquid runoff from exposed WMU soil and waste, or there is excess water from soil/waste strengthening and compaction activities, the wastewater will be managed within the construction footprint.

3.2.9 Stormwater Management

PROJECT construction activities would be completed in accordance with a PROJECT Stormwater Pollution Prevention Plan (SWPPP) as required by the State Water Resources Control Board NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order WQ 2022-0057-DWQ (CGP). A plan to sample, evaluate and manage all stormwater runoff generated during construction will be provided in the SWPPP submitted to the SFBRWQCB. The SWPPP will also identify stormwater discharge locations. Stormwater would be managed through approved BMPs that are designed, constructed, and managed to reduce pollutants in stormwater. The CGP also requires the implementation of post-construction BMPs to reduce pollutants in stormwater after construction phases have been completed. Post-construction stormwater management of runoff from new impervious surfaces could include settlement and bio-filtration units, for example.

3.2.10 Site Security

The PROJECT site consists of Facility-owned property and non-Facility-owned property.

The property is fenced and has controlled access points through designated and guarded locations. Access to the property requires Facility authorization.

Access to the PROJECT would be controlled by installing fencing around the work areas (as necessary), designating sign-in locations, and placing signage (identifying the PROJECT, contacts, location of check in, support zone, contamination reduction zone, and exclusion zone) as necessary to inform and protect Facility personnel and/or the general public from PROJECT activities. All work on Facility-owned property would be in accordance with Facility



permitting requirements and Rules & Standing Instructions (R&SIs), which govern all aspects of working safely and maintaining security within the Facility.

3.2.11 Health and Safety

Work performed at the PROJECT WMUs that may potentially disturb WMU soils would require 40-Hour Hazardous Waste Operations and Emergency Response training and certification, as well as proper personal protective equipment (PPE).

3.2.12 Signage

There is existing permanent signage to identify the boundaries of each PROJECT WMU. Any additional temporary signage needed during closure activities would be installed. After closure has been completed, any additional permanent signage needed beyond the existing permanent signage would be installed around the PROJECT WMUs to identify the site and access limitations. These signs would likely be made of reflective material but would not necessarily be individually lighted. Sign sizing would conform to Facility permitting requirements.

3.2.13 Traffic Management Plan

The construction contractor would prepare a Traffic Management Plan (TMP) for the work as part of the Construction Work Plan. The TMP would include procedures, requirements, and provisions to be implemented to ensure the efficient and safe movement of vehicles on the Facility's roadways. The TMP would also describe the movement of vehicular traffic onto and off the WMU 14 Consolidation Cell and/or cover, the WMU 32 cover, and all staging areas. Items to be addressed include, but are not limited to, roles and responsibilities, construction traffic, Facility-access, safe driving policies and procedures, haul routes, and staging and work areas. The TMP would also describe the routes and safe movement between the work and stockpile areas. Visible dust emissions control measures will be included as part of the OMCP. Consistent with BAAQMD Regulation 6-1, visible dust emissions control measures would include the watering or use of chemical suppressants on haul roads and limiting off-road vehicle speeds.

3.2.14 Access Roads

The PROJECT site is accessible from existing county roadways and collector roadways within the Facility (PROJECT WMUs). Additionally, the PROJECT would involve the construction of temporary and permanent access roads to allow vehicles and equipment to access the PROJECT site during construction and post-closure activities. Stormwater runoff from new impervious surfaces constructed for the project, including new impervious access road surfaces, will be treated prior to discharge into jurisdictional waters. Specifics will be identified in the individual Title 27 Closure Plans submitted to the SFBRWQCB for review and approval.

As summarized in Table 3.2-1, the PROJECT would disturb a total of approximately 10 acres for the construction of temporary access roads and disturb a total of approximately 3.5 acres for the construction of permanent access roads. WMUs 10/11/14 are generally accessible through the Facility from Solano Way, WMUs 31 and 32 are accessible through the Facility from Waterfront Road. Access road details associated with the PROJECT are presented in Table 3.2-1 and the location of Solano Way and Waterfront Road relative to each Project site are depicted on Figure 2-3 through Figure 2-5.



3.2.15 Access Road Maintenance

Post-closure, the new permanent access roads at WMUs 10/11/14 would continue to be used by low-ground-pressure vehicles and pickup trucks. The new permanent access roads would be monitored and maintained as part of regular, long-term operations and maintenance of the cover system. The use of access roads by maintenance vehicles would be limited to reduce surface rutting, differential settlements, and potential damage to the cover system. Visible dust emissions control measures will be included as part of the OMCP. Consistent with BAAQMD Regulation 6-1, visible dust emissions control measures would include the watering or use of chemical suppressants on haul roads and limiting off-road vehicle speeds.

WMU 32 access roads consist of existing Facility gravel and paved access ways. Minor road grading and rock placement may occur to maintain these existing roads but would not generate wastes or disturb existing soils.

Existing Facility gravel and asphalt roads would remain after completion of the on-Facility PROJECT components to support the current operation of the Facility and to facilitate post-closure inspections and maintenance.



4.0 OPERATION AND MAINTENANCE ACTIVITIES

4.1 CLOSED WMU INSPECTION, MAINTENANCE, AND REPAIR

The WMUs 14 and 32 covers would be regularly inspected, maintained, and repaired/upgraded in accordance with SFBRWQCB-approved Closure and Post-Closure Maintenance Plans (CPCMP). Inspections would take place from permanent roadways and access areas where covers have been constructed. Anticipated maintenance and repair activities would include, keeping erosion control surfaces and surface water drainage ways clear and in good condition; repairs to signage, gates, and fences; monitoring device repair; re-leveling of the structural roof at WMU 32, maintaining the bird-deterrent perimeter fencing at WMU 32 to prevent entanglement of wildlife, and removal of invasive plant species. Minor repairs to the structures mentioned above would require the use of hand and power tools. Major repairs may be performed in the event of erosion, settlement, or damage to the covers under Title 27 and waste discharge requirements; major repairs may necessitate the use of heavy equipment. Upgrades to berm heights, armor layers, and access roads may result from adaptive management responses to sea level rise.

4.2 GROUNDWATER MONITORING

The PROJECT would include the installation and periodic sampling of groundwater monitoring wells at WMU 14 and WMU 32 in accordance with the post-closure monitoring plan approved by the SFBRWQCB. The existing Self-Monitoring Plan would be updated to include the PROJECT post-closure monitoring requirements. After sufficient groundwater data has been collected post closure the data would be reviewed, and groundwater monitoring wells could be removed or reduced, as needed, over time. However, the sampling frequency would remain as outlined in the updated Self-Monitoring Plan. Any proposed changes to the Self-Monitoring Plan would be submitted to SFBRWQCB for approval.

The installation, maintenance, sampling, and repair of groundwater monitoring wells would be performed from permanent access roadways and developed access areas around and/or over the WMU cover surfaces.

4.3 RESTORATION MAINTENANCE

Restoration maintenance would be conducted at WMUs 10/11 and 31 as specified in the approved HMMP. Restoration maintenance would include non-native plant management, irrigation system use, and additional planting of native vegetation, as necessary. Maintenance of the restoration area would be conducted using hand tools and aquatic-safe herbicides.

Maintenance activities in the restoration areas during the agency approved monitoring period following planting could include: (i) erosion control and repair of slopes should an extreme storm event occur; (ii) inspections and maintenance of the temporary irrigation system; (iii) inspections for colonization of problematic non-native plants; and (iv) installation of additional wetland plants, if necessary, to meet performance criteria.

Removal of non-native species in the restoration areas or installation of additional wetland plants would be conducted as needed and recommended in the annual Habitat Mitigation and Monitoring Plan. Removal of non-native species may be conducted by a qualified wetland plant biologist or by Facility maintenance personnel as directed by a qualified wetland plant biologist.



Monitoring would be conducted to ensure the success criteria included in the HMMP is achieved. At the conclusion of the monitoring period, USACE would confirm that the success criteria have been met or if subsequent actions or monitoring is needed.



5.0 ENVIRONMENTAL CHECKLIST AND ENVIRONMENTAL EVALUATION

The environmental factors checked below would be potentially affected by this PROJECT, involving at least one impact that requires mitigation to reduce the impact from "Potentially Significant" to "Less Than Significant" as indicated by the checklist on the following pages.

- | | | |
|---|--|--|
| <input type="checkbox"/> Aesthetics | <input type="checkbox"/> Agricultural and Forestry Resources | <input checked="" type="checkbox"/> Air Quality |
| <input checked="" type="checkbox"/> Biological Resources | <input checked="" type="checkbox"/> Cultural Resources | <input type="checkbox"/> Energy |
| <input checked="" type="checkbox"/> Geology/Soils | <input type="checkbox"/> Greenhouse Gas Emissions | <input checked="" type="checkbox"/> Hazards/Hazardous Materials |
| <input checked="" type="checkbox"/> Hydrology/Water Quality | <input type="checkbox"/> Land Use/Planning | <input type="checkbox"/> Mineral Resources |
| <input type="checkbox"/> Noise | <input type="checkbox"/> Population/Housing | <input type="checkbox"/> Public Services |
| <input type="checkbox"/> Recreation | <input type="checkbox"/> Transportation/Traffic | <input checked="" type="checkbox"/> Tribal Cultural Resources |
| <input type="checkbox"/> Utilities and Service Systems | <input type="checkbox"/> Wildfire | <input checked="" type="checkbox"/> Mandatory Findings of Significance |

Evaluation of Environmental Impacts

Section 5.0, Environmental Checklist and Environmental Evaluation presents the environmental checklist form found in Appendix G of the CEQA Guidelines. The checklist form is used to describe the impacts of the PROJECT. A discussion follows each environmental issue identified in the checklist. Included in each discussion are PROJECT-specific mitigation measures recommended as appropriate. For this checklist, the following designations are used:

Potentially Significant Impact: An impact that could be significant and for which mitigation has not been identified. If any potentially significant impacts are identified, an EIR must be prepared instead of an ISMND.

Less Than Significant with Mitigation Incorporated: This designation applies where the incorporation of project specific mitigation measures will reduce an effect from "Potentially Significant Impact" to a "Less Than Significant Impact." All project-level mitigation measures must be described, including a brief explanation of how the measures reduce the effect to a less than significant level.

Less Than Significant Impact: Any impact that would not be considered significant under CEQA, relative to existing standards.

No Impact: The PROJECT would not have any impact. A brief explanation is required for all answers except "No Impact" answers that are adequately supported by the information sources a Lead Agency cites following each question. A "No Impact" answer is adequately supported if the referenced information sources show that the impact simply does not apply to projects like the one involved (e.g., the project falls outside a fault rupture zone). A "No Impact" answer should be explained where it is based on project-specific factors as well as general standards (e.g., the project would not expose sensitive receptors to pollutants, based on a project-specific screening analysis).



5.1 AESTHETICS

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Have a substantial adverse effect on a scenic vista?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) In nonurbanized 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 point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5.1.1 Environmental Setting

Regional Visual Character

The PROJECT is in north Contra Costa County, approximately 2 miles east of I-680 and the City of Martinez. This portion of the County is characterized as an industrial area as it is primarily developed with various industrial facilities and infrastructure to support operation of the Facility. Beyond the developed industrial facilities, this area consists of a mix of open space lands, marshlands, and waterways such as the Point Edith Wildlife Area, Carquinez Strait, and Suisun Bay. The nearest residential land uses include the unincorporated community of Vine Hill, located approximately 1.5 miles southwest of WMU 32; and the community of Clyde, located approximately 1.75 miles southeast of WMU 11/10/14.

Scenic resources in the County include major ridges and scenic waterways. The nearest scenic waterways include Suisun Bay and the Carquinez Strait north of the PROJECT site. The nearest ridgelines include the ridgelines west of the City of Martinez, approximately 4 miles to the west, and Mount Diablo approximately 14 miles south of the PROJECT site (Contra Costa County 2005).

There are no officially designated state scenic highways near the PROJECT site. The nearest officially designated state scenic highway is State Route 24 that extends from the Caldecott tunnel to I-680, approximately 10 miles south of the PROJECT site; and the segment of I-680 that extends from the State Route 24 interchange to the Alameda County border, approximately 10 miles south of the PROJECT site (California Department of Transportation [Caltrans] 2023). In addition, the County General Plan identifies Highway 4 from the City of Hercules to Railroad Avenue in the City of Pittsburg, approximately 2 miles south of the PROJECT site, as a proposed state scenic highway (Contra Costa County 2005). The County General Plan also identifies the segment of Waterfront Road, outside of the Facility, as a “connecting road” that has scenic potential or connects scenic areas (Contra Costa



County 2005). The segment of Waterfront Road within the Facility is not identified as a scenic connecting route in the County General Plan (Contra Costa County 2005).

Project Site Visual Character

The PROJECT site consists of the PROJECT WMUs, which are low-lying broad basins with bermed perimeters made of native soil fill within the Facility property along Waterfront Road. The PROJECT WMUs were created for the disposal of waste material. However, over time the WMUs became overgrown with vegetation due to inactivity. The wetlands that subsequently formed within the WMUs are not remnant original bay wetlands; rather the wetlands formed within the berms of the WMUs following cessation of active waste management. Land uses in the immediate vicinity of the PROJECT site consists of various Facility infrastructure to the west and south, the Carquinez Strait and Suisun Bay to the north, and the Point Edith Wildlife Area to the east. Visibility of the PROJECT WMUs is limited to public viewers due to the surrounding industrial infrastructure and distance from residential uses and major roadways. Furthermore, public access within the Facility property is restricted and therefore the PROJECT WMUs are not visible from Waterfront Road. Additionally, the proposed WMU 32 structure's roof line, the only structural features included in the PROJECT, would be approximately the same height or lower compared to the existing warehouse located on the east side of WMU 32 and as such, the PROJECT would not result in significant changes in the scale of structures on-site.

5.1.2 Methodology

The PROJECT-related changes to the aesthetic character of the site and surrounding area are identified and qualitatively evaluated based on whether the PROJECT would impact the existing physical conditions and viewer sensitivities of the study area, which includes the land located adjacent to and within the Facility. Public sensitivity of aesthetic resources around the WMUs was gauged through interpretation of the County General Plan and review of topographic and street maps, and photographs of the site vicinity. The County General Plan and Zoning Ordinance were reviewed to determine the PROJECT's consistency with applicable policies pertaining to scenic quality. Additionally, the PROJECT site plans were reviewed to determine compliance with the requirements of the County General Plan and Zoning Ordinance.

5.1.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact AES-1 Have a substantial adverse effect on a scenic vista?

Impact Analysis

There are no designated scenic vistas in the PROJECT vicinity. The PROJECT site is located within an existing industrial area that is surrounded by open space, marshlands, and waterways, including Suisun Bay and the Carquinez Strait which the County General Plan identifies as important scenic resources. As discussed in Section 2.0, Project Description, the PROJECT would involve the closure of PROJECT WMUs and mitigation and maintenance activities. Additionally, closure of WMU 32 involves placement of a Title 27 compliance cover system which would include elevated structural elements. The elevated structure's roof line would be approximately the same height or lower compared to the existing warehouse located on the east side of WMU 32 and therefore, the PROJECT would not result in construction of new structures that would change the scale of structures on-site or



provide new obstruction of views. The PROJECT does not involve the development of new structures that would obstruct public views toward Suisun Bay or the Carquinez Strait. As such, the PROJECT would not have a substantial adverse effect on a scenic vista and no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact AES-2 Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

Impact Analysis

The PROJECT site is not located near an officially designated state scenic highway. The nearest officially designated state scenic highways are approximately 10 miles south of the PROJECT site and include State Route 24 and the segment of I-680 that extends from the State Route 24 interchange to the Alameda County border. As such, the PROJECT would not involve the removal of scenic resources within a state scenic highway and no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact AES-3 In nonurbanized 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 point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

Impact Analysis

The PROJECT WMUs are located within an existing industrialized area of the County. This portion of the County, which includes the PROJECT site, is zoned Heavy Industrial by the County's Zoning Code. Uses permitted within this zoning district include, but are not limited to, the manufacturing or processing of petroleum, lumber, steel, chemicals,



explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products (Contra Costa County 2023). The PROJECT would involve the closure of PROJECT WMUs and mitigation and maintenance activities. These activities would be consistent with the uses allowed in the Heavy Industrial zoning district and the existing uses at the site.

In addition, the PROJECT would be subject to the goals and policies of the County General Plan that govern scenic quality. The PROJECT activities would be consistent with the industrial setting and would not alter the existing visual character of the site or its surroundings. As such, the PROJECT would not conflict with the County's Zoning Code for the Heavy Industrial zoning district, or with the goals and policies of the General Plan that govern scenic quality. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact AES-4 Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Impact Analysis

The PROJECT site is located within and adjacent to the Facility boundary. The PROJECT would not include the construction of new structures that would require permanent lighting fixtures or include reflective materials that would produce glare. In addition, PROJECT construction activities would primarily take place during the day. However, maintenance and emergency service activities at the PROJECT site may occur at any time, as necessary. In the event nighttime work is required temporary lighting fixtures would be installed. The Facility already utilizes nighttime lighting because it operates round the clock and therefore, temporary increases in night lighting in the Facility area is not uncommon. Furthermore, temporary lighting fixtures would only be turned on when necessary to safely complete construction activities and would cast light in a downward direction and focused on the work area to minimize light spillover into off-site areas. Therefore, impacts related to light and glare would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.2 AGRICULTURAL AND FORESTRY RESOURCES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporation	Less Than Significant Impact	No Impact
1) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Conflict with existing zoning for agricultural use or a Williamson Act contract?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) Conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4) Result in the loss of forestland or conversion of forestland to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forestland to non-forest use?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.2.1 Environmental Setting

The California Department of Conservation (DOC), as part of its Farmland Mapping and Monitoring Program (FMMP), produces maps and statistical data to analyze potential impacts on California's agricultural resources. Within the County, the FMMP has mapped lands into the following seven categories: Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, Grazing Land, Urban and Built-Up Land, and Other Land (DOC 2016). For environmental review purposes under CEQA, the categories of Prime Farmland, Farmland of Statewide Importance, Unique Farmland, Farmland of Local Importance, and Grazing Land constitute 'agricultural land' (PRC Section 21060.1). The remaining categories are used for reporting changes in land use as required for FMMP's biennial farmland conversion report (DOC 2019).

The PROJECT is located in north Contra Costa County. This portion of Contra Costa County is primarily developed with industrial infrastructure that is surrounded by open space, marshlands, and waterways. The PROJECT WMUs consist of basins that are used for disposal of waste material and categorized as Urban and Built-Up Land by the FMMP. The FMMP defines Urban and Built-Up Land as areas occupied by structures and used for developed purposes, such as industrial uses (DOC 2016).

5.2.2 Methodology

The PROJECT WMUs are within the County's Heavy Industrial zoning district. Uses permitted in the Heavy Industrial zoning district include, but are not limited to, the manufacturing or processing of petroleum, lumber, steel, chemicals, explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products.



Agricultural uses are not permitted in the Heavy Industrial zoning district (Contra Costa County 2018). The PROJECT WMUs do not contain land that is enrolled in a Williamson Act contract (Contra Costa County 2016).

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Conservation Element of the County General Plan, DOC Important Farmland Finder map, and the County's 2016 Agricultural Preserves Map.

5.2.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact AG-1	Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?
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Impact Analysis

The PROJECT site is in an area developed with industrial uses and surrounded by a mix of open space, marshlands, and waterways. The FMMP has mapped the PROJECT site as Urban and Built-Up Land and Other Land (DOC 2016). These FMMP categories consist of lands that are developed with urban uses, or other uses that are not suitable for agriculture purposes. As such, the PROJECT would not convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance to a non-agricultural use. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact AG-2	Conflict with existing zoning for agricultural use or a Williamson Act contract?
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Impact Analysis

The PROJECT site is not enrolled in a Williamson Act contract and is not zoned or designated by the County for agricultural uses (Contra Costa County 2016; Contra Costa County 2010). Therefore, the PROJECT would not conflict with existing zoning or with a Williamson Act contract. No impact would occur.

Level of Significance Before Mitigation

No Impact.



Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact AG-3	Conflict with existing zoning for, or cause rezoning of, forestland (as defined in Public Resources Code section 12220[g]), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104[g])?
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Impact Analysis

The PROJECT site does not contain forestland (as defined in PRC Section 12220[g]), or timberland (as defined by PRC Section 4526). The PROJECT site is zoned Heavy Industrial by the County Zoning Ordinance which does not permit forestland or timberland production. As such, the PROJECT would not convert forestland or timberland to a non-agricultural use and no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact AG-4	Result in the loss of forestland or conversion of forestland to non-forest use?
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Impact Analysis

There are no forestlands on or adjoining the PROJECT site, or within the general vicinity of the PROJECT site. As such, the PROJECT would not result in the loss of forestland or the conversion of forestland to non-forest use. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



Impact AG-5 **Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forestland to non-forest use?**

Impact Analysis

The PROJECT site does not contain lands with Prime Farmland, Unique Farmland, Farmland of State Importance, or Farmland of Local Importance; and is not enrolled in a Williamson Act contract. The PROJECT site is not zoned for forestland or timberland production and would not be rezoned for agricultural use. Therefore, the PROJECT would not result in the conversion of farmland or forestland to a non-agricultural use. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.3 AIR QUALITY

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Conflict with or obstruct implementation of the applicable air quality plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Expose Sensitive Receptors to substantial pollutant concentrations?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5.3.1 Environmental Setting

The PROJECT is located in Contra Costa County, which is within the boundaries of the San Francisco Bay Area Air Basin and under the jurisdiction of the BAAQMD and the California Air Resources Board (CARB). The regional climate within the San Francisco Bay Area is driven by a summertime high-pressure cell centered over the northeastern Pacific Ocean that dominates the summer climate of the West Coast. The persistence of this high-pressure cell generally results in negligible precipitation during the summer and meteorological conditions are typically stable with a steady northwesterly wind flow. This flow causes upwelling of cold ocean water from below the surface, which produces a band of cold water off the California coast. The cool and moisture-laden air approaching the coast from the Pacific Ocean is further cooled by the presence of the cold-water band, resulting in condensation and the presence of fog and stratus clouds along the Northern California coast. In the winter, the Pacific high-pressure cell weakens and shifts to the south, resulting in wind flows offshore, the absence of upwelling, and an increase in the occurrence of storms. Winter stagnation episodes are characterized by nocturnal drainage wind flows in coastal valleys. Drainage is a reversal of the usual daytime air-flow patterns; air moves from the Central Valley toward the coast and back down toward the Bay from the smaller valleys within the Air Basin (BAAQMD 2017a).

5.3.2 Methodology

Emissions of criteria air pollutants were quantified by using the following methods:

- Construction equipment horsepower, load factors, and emission factors from the California Emissions Estimator Model (CalEEMod) User’s Guide Appendix D (California Air Pollution Control Officers Association [CAPCOA] 2021).
- Vehicle emission factors from EMFAC2021 software.
- Fugitive dust emission factors for paved and unpaved road travel from AP-42 (USEPA 2006 and 2011).
- Fugitive dust emission factors for disturbed soil from the BAAQMD Permit Handbook (BAAQMD 2021) and CalEEMod User’s Guide Appendix A (CAPCOA 2021).
- Fugitive dust emission factors for stockpiling from the BAAQMD Permit Handbook (BAAQMD 2021).
- Fugitive dust control efficiencies from the BAAQMD Permit Handbook that recommends a maximum abatement efficiency of 70 percent when watering to suppress dust is used (BAAQMD 2021).



- Potential landfill gas generation was estimated using the Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories model.
- Volatile and semi-volatile constituent emissions flux from contaminated materials calculated using the Exposure Model for Soil-Organic Fate and Transport Model (EMSOFT; USEPA 2002).

5.3.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact AIR-1 Conflict with or obstruct implementation of the applicable air quality plan?

Impact Analysis

The BAAQMD's 2017 Clean Air Plan is the regional air quality plan (AQP) for the Air Basin (BAAQMD 2017b). It identifies strategies to bring regional emissions into compliance with federal and State air quality standards. The BAAQMD's Guidance provides three criteria for determining if a plan-level project is consistent with the current AQP control measures. However, the BAAQMD does not provide a threshold of significance for project-level consistency analysis. Therefore, the following criteria will be used for determining a project's consistency with the AQP.

- Criterion 1: Does the project support the primary goals of the AQP?
- Criterion 2: Does the project include applicable control measures from the AQP?
- Criterion 3: Does the project disrupt or hinder implementation of any AQP control measures?

Criterion 1

The primary goals of the 2017 Clean Air Plan, the current AQP, are to:

- Protect public health through the attainment air quality standards, and
- Protect the climate.

As discussed in impact discussions AIR-2, AIR-3, and AIR-4, the PROJECT would not significantly contribute to cumulative nonattainment pollutant violations, expose sensitive receptors to substantial pollutant concentrations, or result in other emissions affecting a substantial number of people after implementation of Mitigation Measure AIR-1. The BAAQMD has not developed qualitative thresholds for fugitive dust and requires that all projects implement the basic construction mitigation measures listed in Mitigation Measure AIR-1. Therefore, the PROJECT is consistent with criterion 1 with incorporation of Mitigation Measure AIR-1, which would require all construction contractors to implement the basic construction mitigation measures recommended by the BAAQMD to reduce fugitive dust emissions.

Criterion 2

The 2017 Clean Air Plan contains 85 control measures aimed at reducing air and climate pollutants in the Bay Area. For purposes of consistency with climate planning efforts at the state level, the control strategy in the Clean Air Plan is based upon the same economic sector framework used by the CARB for its 2014 update to the Assembly Bill (AB) 32 Scoping Plan. The sectors are as follows:

- Stationary Sources,
- Transportation,



- Energy,
- Buildings,
- Agriculture,
- Natural and Working Lands,
- Waste Management,
- Water, and
- Super-Greenhouse Gases (GHGs) Pollutants.

The PROJECT would only have temporary air emissions impacts from construction and long-term operational emissions would be minimal. The 2017 Clean Air Plan control measures are focused on the operational phase of a project. As such, none of the 85 control measures are applicable to the PROJECT; therefore, the PROJECT would be consistent with the 2017 Clean Air Plan.

Construction Emissions

As presented in Table 5.3-1 the pollutants of concern during PROJECT construction include reactive organic gas (ROG), nitrogen oxides, particulate matter 10 microns or less in diameter (PM₁₀), and particulate matter 2.5 microns or less in diameter (PM_{2.5}). The BAAQMD Criteria Air Pollutant Significance thresholds were used to determine impacts.

Table 5.3-1. Annual Construction Emissions

Construction Year	Source	ROG	CO	NO _x	SO _x	^a PM ₁₀	^a PM _{2.5}	^b PM ₁₀ Fugitive	^b PM _{2.5} Fugitive
°Year 1 - WMU 14 Consolidation Cell	PROJECT Emissions (Tons/Year)	0.33	8.84	2.09	0.02	0.07	0.06	3.12	0.52
	Average Daily Emissions (lbs/day)	2.71	73.69	17.43	0.16	0.60	0.51	26.00	4.30
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 2 - WMU 10/11	PROJECT Emissions (Tons/Year)	0.37	11.05	2.65	0.02	0.08	0.07	9.22	1.15
	Average Daily Emissions (lbs/day)	3.08	92.07	22.07	0.20	0.70	0.57	76.86	9.62
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 3 - WMU 10/11	PROJECT Emissions (Tons/Year)	0.39	11.53	2.83	0.03	0.09	0.07	10.42	1.04
	Average Daily Emissions (lbs/day)	3.26	96.08	23.61	0.22	0.72	0.57	86.81	8.68
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 4 - WMU 31	PROJECT Emissions (Tons/Year)	0.39	11.53	2.83	0.03	0.09	0.07	11.04	1.33
	Average Daily Emissions (lbs/day)	3.26	96.08	23.61	0.22	0.72	0.57	91.96	11.06
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A



Construction Year	Source	ROG	CO	NO _x	SO _x	^a PM ₁₀	^a PM _{2.5}	^b PM ₁₀ Fugitive	^b PM _{2.5} Fugitive
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 5 - WMU 31	PROJECT Emissions (Tons/Year)	0.39	11.53	2.83	0.03	0.089	0.07	11.03	1.33
	Average Daily Emissions (lbs/day)	3.26	96.08	23.61	0.22	0.72	0.57	91.96	11.11
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 6 - WMU 14 Cover	PROJECT Emissions (Tons/Year)	0.19	5.11	1.49	0.01	0.05	0.04	0.56	0.06
	Average Daily Emissions (lbs/day)	2.16	56.83	16.57	0.12	0.53	0.41	6.26	0.63
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 7 - WMU 32	PROJECT Emissions (Tons/Year)	0.76	7.32	4.33	0.02	0.13	0.11	3.64	0.58
	Average Daily Emissions (lbs/day)	8.63	83.66	49.44	0.26	1.45	1.22	41.61	6.67
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A
Year 8 - WMU 32	PROJECT Emissions (Tons/Year)	0.57	9.25	4.17	0.02	0.14	0.13	0.82	0.30
	Average Daily Emissions (lbs/day)	6.55	105.75	47.68	0.26	1.62	1.49	9.34	3.44
	BAAQMD Threshold of Significance (lbs/day)	54	N/A	54	N/A	82	54	N/A	N/A
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A

Source: Stantec Consulting Services 2023 (Appendix B).

Notes:

a Construction-related PM10/PM2.5 emissions are directly emitted by equipment and vehicles

b Fugitive PM10/PM2.5 dust emissions are related to ground disturbance activities, storage piles, and on-site vehicle traffic

c The outer berm construction for WMU 14 would include a cement silo that would be controlled by a dust collector with a 99.9% removal rating. Fugitive dust from batch mixing would be controlled by water spray with a 70% abatement. Therefore, the emissions from these sources would be negligible.

BAAQMD – Bay Area Air Quality Management District; CO – carbon monoxide; NO_x – nitrogen oxides; PM2.5 – particulate matter 2.5 microns or less in diameter; PM10 – particulate matter 10 microns or less in diameter; ROG – reactive organic gas; SO_x – sulfur oxides; WMU – Waste Management Unit

As shown in Table 5.3-1, the PROJECT would comply with all applicable rules and regulations and the PROJECT would not impede attainment because its emissions fall below the BAAQMD regional significance thresholds for PROJECT construction. In addition, as shown in the Project Design and Appendix B, the PROJECT would use Tier 4 diesel engine standards for several of the off-road equipment and heavy-duty diesel trucks used for hauling and fugitive dust control would be 2015 or newer.

Operational Emissions

Maintenance of the PROJECT site would be performed by existing personnel, thus there is no anticipated increase in operational emissions associated with ongoing maintenance. The PROJECT does include a landfill gas (LFG) system



to handle potential gas that could be generated due to the decomposition of consolidated waste beneath the WMU 14 cap. Gas generated beneath the impermeable cap would be passively vented.

At WMU 32, any gas generated below the cover would be passively conveyed to the perimeter of the unit through the geotextile layer. The gas generation rate at WMU 32 would not change with implementation of the PROJECT, as subsurface soils would not be consolidated. Because the gas generation rate at WMU 32 would not change from the existing conditions as a result of the PROJECT, operational emissions associated with WMU 32 are not evaluated in this ISMND.

At WMU 14, subsurface soils from WMUs 10/11/14 and WMU 31 would be consolidated as part of the PROJECT, which would affect the gas generation rate. The potential gas generation rate at WMU 14 was estimated using the Intergovernmental Panel on Climate Change (IPCC) (IPCC 2006) Guidelines for National Greenhouse Gas Inventories model. The maximum LFG generation rate was estimated to be approximately 26.7 standard cubic feet per minute (scfm). The non-methane organic compounds generation rate was estimated using the procedure of BAAQMD Regulation 8-34-605, Determination of non-methane organic compounds (NMOC) Emission Rates; adopted from 40 CFR 60.759(a)(3)(ii). The NMOC generation rate was estimated to be approximately 5.3 pounds per day (lbs/day) with approximately 2.1 lbs/day attributed to volatile organic compounds (VOCs) or ROG. This is substantially less than the BAAQMD's 54 lbs/day threshold of significance for ROG; therefore, operational impacts due to ROG emissions would be less than significant. Additionally, it is anticipated that there would be no net change in emissions of any other criteria pollutants at WMU 14 due to ongoing maintenance during operations, and thus no impact.

Criterion 3

If the approval of a project would not cause a disruption, delay, or otherwise hinder the implementation of any clean air plan control measure, it would be considered consistent with the 2017 Clean Air Plan. The PROJECT would only have temporary air emissions impacts and long-term operational emissions would be minimal. In addition, both construction and operational emissions would fall below the BAAQMD significance thresholds for all criteria pollutants; therefore, the PROJECT would not affect any clean air plan control measures.

Conclusion

The PROJECT would be consistent with the criteria of the AQP with incorporation of Mitigation Measure AIR-1. As such, with the incorporation of this mitigation measure this impact would be less than significant.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM AIR-1 **Implement Construction Best Management Practices.** The Applicant shall require all construction contractors to implement the basic construction mitigation measures recommended by the BAAQMD to reduce fugitive dust emissions. Emission reduction measures will include, at a minimum, the following measures. Additional measures may be identified by the BAAQMD or contractor as appropriate.

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



- b) All haul trucks transporting soil, sand, or other loose material off-site will be covered.
- c) All visible mud or dirt track-out onto adjacent public roads will be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
- d) All vehicle speeds on unpaved roads will be limited to 15 mph.
- e) Idling times shall be minimized either by shutting equipment off when not in use or by reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of CCR). Clear signage shall be provided for construction workers at all access points.
- f) 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.
- g) Post a publicly visible sign with the telephone number and person to contact at the SFBRWQCB regarding dust complaints. This person will respond and take corrective action within 48 hours. BAAQMD's Complaints number (1-800-334-6367) shall also be visible to ensure compliance with applicable regulations.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact AIR-2	Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or State ambient air quality standard?
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Impact Analysis

In developing thresholds of significance for air pollutants, the BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be cumulatively considerable, resulting in significant adverse air quality impacts to the region's existing air quality conditions. PROJECT construction and operational impacts are assessed separately below.

Construction Emissions

Emissions from construction-related activities are generally short-term in duration but may still cause adverse air quality impacts. The PROJECT would generate emissions from construction equipment exhaust, worker travel, and fugitive dust. These construction emissions include criteria air pollutants from the operation of heavy construction equipment.

As discussed in the Project Description, the PROJECT would be constructed over eight years with construction expected to start in 2024 and end in 2031. The anticipated closure schedule is as follows:

- Year 1 – Construct WMU 14 Consolidation Cell.
- Year 2 – Excavate WMU 10/11 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 10/11 wetland/habitat.
- Year 3 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat.



- Year 4 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat.
- Year 5 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat.
- Year 6 – Construct WMU 14 Consolidation Cell cover.
- Years 7 and 8 – Construct WMU 32 Title 27 Compliance Cover.

The construction schedule utilized in the analysis represents a “worst-case” analysis scenario since emission factors for construction equipment decrease as the analysis year increases, due to improvements in technology and more stringent regulatory requirements. Therefore, construction emissions would decrease if the construction schedule moves to later years. The duration of construction activity and associated equipment represent a reasonable approximation of the expected construction fleet as required pursuant to the CEQA Guidelines.

Table 5.3-1 provides the construction emissions estimated for the PROJECT. The construction emissions in each year are below the recommended thresholds of significance. Because the BAAQMD has not established quantitative thresholds for fugitive dust, the PROJECT would implement Mitigation Measure AIR-1 as recommended by the BAAQMD. As such, the emissions from construction would be less than significant with mitigation. Likewise, the operational emissions of ROG at WMU 14 would be 2.1 lbs/day, which is less than the BAAQMD threshold of significance for ROG; therefore, operational impacts due to ROG emissions would be less than significant. Additionally, it is anticipated that there would be no net change in emissions of any other criteria pollutants at WMU 14 due to ongoing maintenance during operations, and thus no impact.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measure AIR-1.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact AIR-3 Expose sensitive receptors to substantial pollutant concentrations?

Impact Analysis

This discussion addresses whether the PROJECT would expose sensitive receptors to construction-generated fugitive dust (PM₁₀), naturally occurring asbestos, toxic air contaminants (TACs), or operational carbon monoxide hotspots. Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Heightened sensitivity may be caused by health problems, proximity to the emissions source, and/or duration of exposure to air pollutants. Children, pregnant women, the elderly, and those with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses that are typically considered to be sensitive receptors include residences, schools, childcare centers, playgrounds, retirement homes, convalescent homes, hospitals, and medical clinics. The PROJECT site itself is not considered a sensitive receptor.



Because the PROJECT site is located in an industrial setting, there are no sensitive receptors located near the PROJECT site. The nearest potential receptor is the unincorporated community of Vine Hill, 1.5 miles southwest of WMU 32 and the community of Clyde 1.75 miles southeast of WMU 11/10/14.

In November 2023, Geosyntec Consultants prepared a Health Risk Assessment (HRA) to characterize the potential health impacts posed to individuals living or working near the site during PROJECT construction as a result of diesel particulate matter (DPM), VOC, and fugitive dust emissions. The risk was also evaluated during operation as a result of emissions generated from the landfill gas system at WMU 14. As noted previously, operational emissions at WMU 32 would not change from existing conditions as a result of the PROJECT; accordingly, the HRA did not evaluate emissions at WMU 32. The HRA evaluated the risks posed to the residential receptors located southeast and southeast of the site as well as workers on-site and at nearby industrial facilities (Appendix H).

Fugitive Dust PM₁₀

Fugitive dust (PM₁₀) would be generated from site grading, stockpile storage, and other earth-moving activities. Most of this fugitive dust would remain localized and would be deposited near the PROJECT site. However, the potential for impacts from fugitive dust exists unless control measures are implemented to reduce the emissions from the PROJECT site. The BAAQMD has not established quantitative thresholds for fugitive dust and requires the implementation of basic construction mitigation measures as defined in Mitigation Measure AIR-1. The PROJECT would implement Mitigation Measure AIR-1, requiring fugitive dust control measures that are consistent with BMPs established by the BAAQMD, to reduce the PROJECT's construction-generated fugitive dust impacts to a less than significant level.

PM_{2.5}

The PROJECT involves potential emissions of PM_{2.5}. PM_{2.5} emissions may be associated with airborne dust generated from PROJECT activities and equipment exhaust. The HRA prepared for the PROJECT evaluated the potential annual average ground-level concentrations of PM_{2.5} for both residents and workers potentially exposed to PM_{2.5} associated with the PROJECT. The BAAQMD CEQA significance threshold for PM_{2.5} is an incremental increase of greater than 0.3 micrograms per cubic meter (µg/m³) annual average. The maximum ground-level concentration of PM_{2.5} associated with the PROJECT was calculated to be 0.08 µg/m³ for worker receptors and 0.01 µg/m³ for residential receptors. PROJECT PM_{2.5} impacts were calculated to be less than significance per BAAQMD project significance criteria.

Naturally Occurring Asbestos

Construction in areas of rock formations that contain naturally occurring asbestos could release asbestos into the air and pose a health hazard. As described in the Regulatory Setting, BAAQMD enforces CARB's ATCMs at sites that contain ultramafic rock. The ATCM for Construction, Grading, Quarrying and Surface Mining Operations was signed into state law on July 22, 2002, and became effective in the Air Basin in November 2002. The purpose of this regulation is to reduce public exposure to naturally occurring asbestos. A review of the map containing areas more likely to have rock formations containing naturally occurring asbestos in California indicates that there is no asbestos in the immediate PROJECT area (U.S. Geological Survey [USGS] 2011). Therefore, it can be reasonably concluded that the PROJECT would not expose sensitive receptors to naturally occurring asbestos. As such, impacts would be less than significant.



Hazardous Materials/ Toxic Air Contaminants

The PROJECT involves potential emissions of TACs. Exposure of contaminated materials has the potential to generate emissions of volatile and semi-volatile materials considered TACs. The list of TACs evaluated within the HRA are provided in Appendix H. Airborne dust generated from PROJECT activities may contain material considered a TAC. The operation of diesel construction equipment has the potential to generate DPM. Trucks mobilizing equipment and materials to and from the PROJECT site have the potential to generate DPM. Post-closure operation of the landfill gas system involves the exhausting of landfill gases, which may be considered a TAC.

The HRA prepared for the PROJECT evaluated the potential cancer, chronic health, and acute health impacts and PM_{2.5} ground level concentration for both residents and workers potentially exposed to TAC emissions. Health risk impacts were assessed pursuant to the approved methods of the Office of Environmental Health Hazard Assessment (OEHHA) 2015 Risk Assessment Guidelines (Appendix H) and BAAQMD Air Toxics New Source Review Program Health Risk Assessment Guidelines. Cancer risks associated with short-term construction sources were evaluated based on an exposure duration of eight years, consistent with the duration of construction activities. Cancer risks associated with the overall PROJECT were evaluated based on an exposure duration of 30 years and 25 years for residential and worker exposure, respectively, in accordance with the OEHHA Risk Assessment Guidelines (Appendix H). PROJECT health risk impacts were calculated to be less than significant per BAAQMD project significance criteria.

Table 5.3-2. Summary of PROJECT Health Risk Impacts

Health Risk Parameter	Unit	Receptor Type	Impact to MEI	BAAQMD CEQA Significance Threshold	BAAQMD Rule 2-5-301 Threshold	Above Threshold?
Cancer	Chances per Million	Resident	0.6	10	1.0	No
		Worker	0.7			No
Chronic Health	Hazard Index	Resident	<0.01	1.0	0.20	No
		Worker	<0.01			No
Acute Health	Hazard Index	Resident	0.01	1.0	N/A	No
		Worker	0.09			No
PM _{2.5}	µg/m ³	Resident	0.01	0.30	N/A	No
	µg/m ³	Worker	0.08			No

Source: Geosyntec Consulting (Appendix H).

Notes: This health risk assessment was prepared assuming construction would begin in 2020. Since the HRA was prepared, updated air quality modeling has been prepared to capture the updated construction schedule, which is assumed to now begin in 2024. The construction duration and planned construction during each year are expected to remain the same. However, since emissions tend to decrease as time progresses due to stricter regulations and emissions controls, the 2020 HRA presents a conservative analysis.

MEI = maximally exposed individual.

The PROJECT developed a clean-up plan that addresses potential human exposure to the hazardous materials in the waste materials. Work will be completed in accordance with the clean-up plan and standards required by the Occupational Safety and Health Administration (OSHA). Offsite receptors would not be exposed to the hazardous materials due to the intervening topography, meteorological conditions, and design features of the clean-up plan. The individuals most likely to be exposed to potential hazardous materials are the onsite construction workers. OSHA health protective measures such as respiratory equipment would be implemented as needed in accordance with regulatory requirements.



Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measure AIR-1 is required.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact AIR-4	Result in other emissions (such as those leading to odors) affecting a substantial number of people?
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Impact Analysis

While offensive odors rarely cause any physical harm, they can still be unpleasant, leading to distress among the public and often generating citizen complaints to local governments and BAAQMD. During construction activities, the waste material that would be cleaned up by the PROJECT could be particularly odoriferous to onsite receptors as the material is disturbed. Accordingly, the Facility has invested in odor control technologies to address existing odors. As discussed in Section 3.2.7, odor reduction measures implemented during construction may include, but would not be limited to, application of odor suppressants (ODEX or other odor control liquid), odor suppressant foam application, and/or plastic sheeting to cover soil stockpiles or active excavation faces during excavation and soil handling.

Odors may be generated during the closure of the PROJECT WMUs due to the nature of the waste units. Onsite odor monitoring will be conducted routinely to proactively identify and manage potential odors to minimize migration off of the property. The specific equipment utilized to monitor and minimize odors may vary over the course of the PROJECT depending on specific work conditions or the availability of new technology. The PROJECT site has the size and capacity to add equipment necessary to control odor. Application of odor suppressants would likely occur downwind of the PROJECT site, within the area of work. In order to ensure no potentially significant odors occur from construction activities or WMU closures, odor suppressant foam may be applied to the ground surface being disturbed if odors are not sufficiently reduced by application of odor suppressants.

Additional details regarding odor management will be incorporated in an odor control plan for the PROJECT, which will be developed prior to beginning construction. The odor control plan will comply with requirements included in the BAAQMD permit.

With the incorporation of the odor control plan and the distance to offsite receptors (i.e. 1.75 miles to the community of Clyde, which is the nearest offsite receptor), it is not anticipated that offsite receptors would be exposed to substantial odors as a result of the PROJECT. The individuals with the potential to be exposed to substantial odors are the onsite workers during construction. Workers would be equipped with necessary equipment to reduce the odor exposure.

Other sources of odor include diesel exhaust and ROGs, which would be emitted during construction of the PROJECT, which are objectionable to some; however, emissions would disperse rapidly from the PROJECT site and therefore not create objectionable odors affecting a substantial number of people. In addition, there are no sensitive receptors near the PROJECT site. As such, construction odor impacts would be less than significant.



During operation, there would be minimal amounts of LFG passively vented to the atmosphere, which could be a potential odor source. The Facility maintains odor monitoring as part of the operations of the facility and works to address potential issues as they arise. Given that the PROJECT is intended to address the major source of odors from the PROJECT WMUs, the minimal amount of LFG vented to the atmosphere and the distance to the nearest receptors would not result in a significant impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.4 BIOLOGICAL RESOURCES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Have a substantial adverse effect, either directly or through habitat modifications, on any species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish or U.S. Fish and Wildlife Service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) 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?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4) 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?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6) Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.4.1 Environmental Setting

The PROJECT is located in Contra Costa County, California (Figure 2-1). Land uses in the immediate vicinity of the PROJECT site consists of various Facility infrastructure to the west and south, the Carquinez Strait and Suisun Bay to the north, and the Point Edith Wildlife Area to the east. (Figure 2-1 and Figure 2-2). The WMUs and associated work areas are located on Facility-owned property and are adjacent to active portions of the Facility. The PROJECT also includes post-closure activities such as the maintenance and restoration of the closed WMUs.

PROJECT WMUs

The PROJECT WMUs were constructed on former marshland to treat and contain various process wastes from the Facility. The wetlands that subsequently formed within the WMUs are not remnant original bay wetlands but formed within the berms of the WMUs following cessation of active waste management. The perimeter berms keep the units hydrologically isolated from the tidal marsh to the north and east; the primary natural hydrological sources for the PROJECT site are precipitation and groundwater. The WMUs provided low-quality substrate on which vegetation



became established. These wetland features have low function and value but were classified as waters of the U.S. in a USACE-approved jurisdictional determination. Vegetation within the WMUs is comprised of herbaceous wetland and upland species. Upland vegetation is dominated by non-native ruderal annual grasses and forbs. Hydrophytic vegetation is dominant in large portions of the units and in the northern portion of the Facility-owned portion of the PROJECT site.

Existing conditions north of WMUs 10/11/14 consist of disturbed brackish seasonal wetlands and muted tidal waters. These wetlands and waters extend along the northern boundary of the PROJECT site between Waterfront Road and the WMUs. The disturbed brackish seasonal wetlands appear to be subjected to tidal inundation during high tide events as hydrophytic vegetation dominated by halophytes is present, including pickleweed (*Salicornia virginica*, OBL), saltgrass (*Distichlis spicata*, FACW), and alkali heath (*Frankenia salina*, FACW). During high tide events, the areas in the northernmost portion of the WMUs 10/11/14 site, outside of the WMU berms, may receive some tidally influenced hydrology from adjacent brackish marsh and sloughs northeast of the PROJECT site.

The PROJECT has the potential to impact federally listed species including the SMHM. The SMHM is a relatively small rodent found only in suitable salt- and brackish-marsh habitat in the greater San Francisco Bay, San Pablo Bay, and Suisun Bay areas, such as the PROJECT WMUs. The habitat associated with SMHM are pickleweed-dominated and mixed vegetation (including native and nonnative salt- and brackish-marsh species) (Sustaita et al. 2005, Sustaita et al. 2011). Another key habitat requirement for this species is upland or tidal refuge habitat, which is used to escape high tides and storm events.

5.4.2 Methodology

Over the course of approximately 10 years, WRA conducted field surveys through the PROJECT. The purpose of these surveys was to identify potential habitat for special-status plant and wildlife species. The surveys conducted focused on all special status species including those listed as threatened or endangered by the USFWS and the California Department of Fish and Wildlife (CDFW), CDFW-designated sensitive and fully protected species, and those listed in the California Native Plant Society (CNPS) Inventory of Rare and Endangered Plants of California. The results of the biological resources survey are presented in Appendix C (WRA 2019b; WRA 2021) and discussed below.

WRA also delineated all waters of the U.S. and waters of the State on the PROJECT site. This Preliminary Jurisdictional Determination was verified by the USACE (WRA 2010).

Stantec also assessed the databases in 2021 to review any new potentially occurring special-status species within the PROJECT WMUs. No new species occurrences were found (CNPS 2021, CDFW BIOS Natural Diversity Database 2021, USFWS 2021).

Specifically, the resources reviewed include:

- California Department of Fish and Wildlife Natural Diversity Database (CNDDDB) (CDFG 2008, 2009, 2010, 2011) (CDFW 2016, 2017, 2021).
- USFWS quadrangle species lists (USFWS 2021).
- California Native Plant Society (CNPS) online version of the Inventory of Rare and Endangered Plants of California (CNPS 2010, 2011, 2016, 2021).
- CDFG publication "California's Wildlife, Volumes I-III" (Zeiner et al. 1990).
- CDFG publication "Amphibians and Reptile Species of Special Concern in California" (Jennings and Hayes 1994).



- A Field Guide to Western Reptiles and Amphibians (Stebbins 2003).
- Fairy Shrimps of California's Puddles, Pools, and Playas (Eriksen and Belk 1999).

WMU 10/11/14

- A preliminary site visit was conducted on August 15, 2007, to identify suitable habitats for species identified in the literature review as occurring in the greater vicinity (WRA 2009a).
- Floristic, protocol-level rare plant surveys were performed as part of Biological Resource Assessment in 2007 (WRA 2009a).
- California Ridgeway's Rail, (formerly California Clapper Rail) Surveys in 2008, 2009, 2014, 2015, 2016, and 2017 (WRA 2008b, 2009d, 2014, 2015b, 2016b, 2017b).
- Floristic, protocol-level rare plant surveys were conducted on September 21 and 23, 2011 (WRA 2011a).
- A November 5, 2014, focused reconnaissance-level rare plant survey in tidally influenced areas in PROJECT sites north of WMUs 10/11/14 (WRA 2015a).

WMU 31

- A preliminary site assessment was conducted in 2007, to identify suitable habitats for species identified in the literature review as occurring in the greater vicinity of the PROJECT site (WRA 2009b).
- Floristic, protocol-level rare plant surveys as part of Biological Resource Assessment in 2007 (WRA 2009b).
- California Ridgeway's Rail Surveys in 2008, 2009, 2011, 2014, 2015, 2016, and 2017 (WRA 2008c, 2009b, 2011b, 2014, 2015b, 2016b, and 2017b).
- Floristic, protocol-level rare plant surveys were conducted on September 21 and 23, 2011 (WRA 2011a).
- Biological monitoring of data gap closure studies was conducted in 2011.

WMU 32

- A preliminary site visit was conducted on August 10, 2007, to identify suitable habitats for species identified in the literature review as occurring in the immediate vicinity (WRA 2009c).
- Floristic, protocol-level rare plant surveys as part of Biological Resource Assessment in 2007 (WRA 2009c).
- California Ridgeway's Rail Surveys in 2008, 2009 and 2012 through 2017 (WRA 2008d, 2009f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b).
- A floristic, protocol-level rare plant survey was conducted in September 21 and 23, 2011 (WRA 2011a).
- A November 5, 2014, reconnaissance-level focused rare plant survey in tidally influenced areas southeast of WMU 32 PROJECT site (WRA 2015a).
- Biological monitoring of ongoing closure studies was conducted in 2010, 2015, 2016, and 2018 (Appendix C).

Special-Status Plants

Special-status plant species were defined in accordance with the CEQA Guidelines, Section 15380, and the Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities (CDFW 2018c), and includes species that are:

- Federally or State-listed, or proposed for listing, as rare, threatened, or endangered (CDFW 2017d);
- Special Plant as defined by the CNDDDB (CDFW 2018d); or
- Listed by CNPS in the online version of its Inventory of Rare and Endangered Plants of California (CNPS 2018).

Special-status plant species identified in the CNDDDB, CNPS, or in the USFWS databases with potential to occur in the study area, are listed in Appendix C.



Special-Status Wildlife

Special-status wildlife species were defined in accordance with the CEQA Guidelines, Section 15380, and included species that are:

- Listed, proposed for listing, or candidates for listing as threatened or endangered under the federal Endangered Species Act;
- Listed or candidates for listing as threatened or endangered under the California Endangered Species Act;
- Designated as Species of Special Concern by the CDFW; or
- Included on the CDFW “Special Animals” list (CDFW 2018e); or otherwise meet the definition of rare, threatened, or endangered, as described in the CEQA Guidelines, Section 15380.

Special-status wildlife species documented on-site or with suitable habitat in the PROJECT site, specifically WMU 10/11/14, WMU 31, WMU 32 or within the vicinity of the sites are summarized in Appendix C. The study area does not pass through designated critical habitat and there is no critical habitat within 2 miles of the study area.

Fully Protected Species

Fully Protected status was created by the State to provide additional protection to species that were considered rare or faced possible extinction. CDFW identified 37 species of mammals, birds, amphibians, and fish that are considered Fully Protected Species under Fish and Game Code Sections 3511, 4700, 5050, and 5515. Most Fully Protected Species have also been listed as threatened or endangered under the California Endangered Species Act. CDFW Fully Protected Species with potential to occur in the study area are listed in Appendix C.

5.4.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact BIO-1	Have a substantial adverse effect, either directly or through habitat modifications on any species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?
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Impact Analysis

Special-Status Plant Species

No special-status plant species have been observed in the PROJECT site to date. Protocol-level rare plant surveys have been conducted throughout the Facility-owned portion of the PROJECT site and none have been observed during routine site visits or protocol-level surveys (Appendix C). Therefore, potential impacts to special-status plants as a result of the PROJECT WMUs would be less than significant with mitigation.

Special-Status Wildlife Species

During protocol-level surveys and routine site visits, five special-status species (all California species of special concern) were observed in various locations within the Facility-owned portion of the PROJECT site. Burrowing owl (*Athene cunicularia*), northern harrier (*Circus hudsonius*), and Suisun song sparrow (*Melospiza melodia maxillaris*)



have been observed within WMUs 10/11/14 (Appendix C). Northern harrier and Suisun song sparrow have been observed within WMU 31. No special-status species have been observed within WMU 32.

Birds that are listed as California and/or Federal SSC are present on the PROJECT site and the PROJECT site represents suitable habitat for various birds protected under the Migratory Bird Treaty Act. There are approximately 18 trees in WMU 31 that have potential nesting habitat. Construction impacts (such as interruption of breeding) to nesting birds protected under State or federal law is considered a potentially significant impact. However, these trees would be removed as part of another project that would occur prior to construction of the PROJECT. Therefore, tree removal activities are not considered in the ISMND.

Burrowing owl [California and/or Federal Species of Special Concern]

The burrowing owl occurs as a year-round resident and winter visitor in much of California's lowlands, inhabiting open areas with sparse or non-existent tree or shrub canopies. Typical habitat is annual or perennial grassland, although human-modified areas such as agricultural lands and airports are also used (Poulin et al. 1993). This species is dependent on burrowing mammals to provide the burrows that are characteristically used for shelter and nesting, and in northern California is typically found in close association with California ground squirrels (*Spermophilus beecheyi*). Manmade substrates such as pipes or debris piles may also be occupied in place of burrows. Breeding typically takes place from March to July.

The burrowing owl has been documented once on the PROJECT site within WMU 10/11/14 by a Facility worker in February 2014. No evidence of a breeding owl was observed during rail surveys in early March of 2014 (Appendix D). The burrowing owl has a moderate potential to occur within WMUs 31 and 32 but has not been observed. Much of this area contains bare ground or short vegetation, and there are some burrows in these areas suitable for occupation by this species. California ground squirrels and burrows have been observed in the area. The nearest documented occurrence of burrowing owl recorded in the CNDDDB is approximately 1.5 miles south of this area (CDFW 2017). This species has not been observed in the WMUs during rail surveys and breeding habitat has never been documented on the PROJECT site (WRA 2008b-d, 2009d-f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b) and WMU 32 breeding bird surveys in 2010, 2015, 2016, and 2018 (Appendix D).

Northern harrier [California and/or Federal Species of Special Concern]

The northern harrier occurs as a resident and winter visitor in open habitats throughout most of California, including freshwater and brackish marshes, grasslands and fields, agricultural areas, and deserts. Harriers typically nest in treeless areas within patches of dense, relatively tall, vegetation, the composition of which is highly variable; nests are placed on the ground and often located near water or within wetlands (Shuford and Gardali 2008). Harriers are birds of prey and subsist on a variety of small mammals and other vertebrates.

The northern harrier has been documented within WMUs 10/11/14 and 31. This species was observed foraging over WMUs 10/11/14 and 31 during a site visit in 2007 (WRA 2009a, 2009b). These WMUs provides some open foraging habitat for this species and portions of low wetland vegetation are suitable for nesting. The northern harrier has a moderate potential to occur within WMU 32. The WMUs provides some open foraging habitat for this species, and northern portions of the area contain low wetland vegetation suitable for nesting. No northern harriers were observed in this unit; however, skeletal remains of a northern harrier were found in the northwest portion of WMU 32 during a site visit on August 10, 2007 (WRA 2009c).



Suisun song sparrow [California and/or Federal Species of Special Concern]

The Suisun song sparrow (*Melospiza melodia mexillaris*) nests in tidal marsh vegetation and adjacent weedy vegetation of levees. The Suisun song sparrow has been documented within WMUs 10/11/14 and 31. These WMUs and adjacent wetland areas have wetland emergent vegetation to support nesting and foraging of this subspecies. During a site assessment of WMUs 10/11/14 on August 15, 2007, this subspecies was observed within the cattail-tule dominated marsh and adjacent upland vegetation east of the unit (WRA 2009a). The species was also observed foraging during the site assessments of WMU 31 in 2007 within cattail-tule dominated marsh within the WMU and adjacent upland vegetation (WRA 2009b). During a 2007 site assessment conducted for a related project in WMU 4 of the Facility, WRA biologists also observed several song sparrows, assumed to be of this subspecies (WRA 2008 a, b).

California Ridgway's Rail [Federal Endangered, State Endangered, CDFW Fully Protected Species]

The California Ridgway's Rail (CRR) (*Rallus obsoletus obsoletus*), formerly known as California clapper rail (*R. longirostris obsoletus*), is the resident Ridgway's/clapper rail subspecies of northern and central California. Although more widespread in the past, it is currently restricted to the San Francisco Bay estuary. The CRR occurs only within salt and brackish marshes. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, CRR typically inhabits salt marshes dominated by pickleweed and cordgrass. Brackish marshes supporting CRR occur along major sloughs and rivers of San Pablo Bay and along tidal sloughs of Suisun Marsh. Nesting occurs from March through July, with peak activity in late April to late May. CRR nests, constructed of wetland vegetation and platform-shaped, are placed near the ground in clumps of dense vegetation, usually in the lower marsh zone near small tidal channels (DeGroot 1927, Evens and Page 1983, Harvey 1988).

WRA conducted rail surveys at WMUs 10/11/14, 31 and 32 from 2008 through 2017, an effort of 332 hours over 80 days. The 2008 and 2009 surveys were reconnaissance surveys to support assessment of WMU biological resources. Surveys from 2011 to 2017 were USFWS-approved protocol-level surveys conducted to support investigation and studies within the WMUs, or as an ongoing effort to demonstrate absence of CRR during the Section 7 Consultation. The last protocol-level surveys were conducted in 2017 (WRA 2019b). From 2008 through 2017, seven protocol-level surveys were conducted at WMU 31, seven surveys for WMU 32, and six surveys for WMU 10/11/14. Of those 20 surveys, the CRR did not occur within the PROJECT site.

No nesting CRR have been detected within or immediately adjacent to the Facility since WRA initiated surveys of the WMUs in 2008, and only one detection of a single, unanswered call from a single individual has been documented within or adjacent to the Facility in March 2009 (WRA 2009). The 10 years of surveys suggest that CRR is not breeding within the immediate vicinity of the PROJECT Area. No habitat for CRR exists within the PROJECT site, nor have CRRs been detected immediately adjacent to the Facility in CRR habitat. However, they may occasionally use higher elevation marsh areas or marsh/upland transition zones in the vicinity of the Facility to escape high tides (WRA 2008b-d, 2009d-f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b).

CRR has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017 (WRA 2008b-d, 2009d-f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b). One CRR was detected north of WMU 31 within Point Edith Wildlife Area during a single (of four total) protocol-level rail survey visit on March 17, 2009 (WRA 2009b). Overall, the 10 years of surveys suggest that CRR is not breeding within the immediate vicinity of the PROJECT site.



Salt marsh harvest mouse (Federal Endangered, State Endangered, CDFW Fully Protected Species)

The SMHM is a relatively small rodent found only in suitable salt- and brackish-marsh habitat in the greater San Francisco Bay, San Pablo Bay, and Suisun Bay areas. The habitat associated with SMHM has been described as pickleweed-dominated vegetation (Fisler 1965), though more recent studies have shown that SMHM is supported equally in pickleweed-dominated and mixed vegetation (including native and non-native salt- and brackish-marsh species) (Sustaita et al. 2005, Sustaita et al. 2011). SMHM prefers deep, dense vegetative cover between 11.8 and 23.6 inches in height (USFWS 1984), though there are indications that shorter stands (5.9 inches is the shortest commonly used) of pickleweed may also support an abundance of this species (Fisler 1965; Shellhammer et al. 1982; USFWS 2013).

SMHM has a moderate potential to occur within WMUs 10/11/14, 31, and 32. The WMUs contain wetland communities suitable for this species. Additionally, upland communities adjacent to marshes present within the WMUs may be used opportunistically for foraging by this species. The nearest documented occurrences are in Point Edith Wildlife Area and across Pacheco Creek west of the WMUs.

On March 12 and 13, 2013, WRA biologists conducted site visits to WMUs 10/11/14, 31 and 32 to map SMHM habitat based on a request from the Service (2013a). Areas considered "potential habitat" were distinguished from non-habitat using a list of habitat suitability criteria taken from the available scientific literature and recovery documents. Criteria used to determine which areas to include or exclude were based on structural components of the vegetation, such as percent cover, height, and the structure provided by dominant plant species (WRA 2013b).

Due to the overall low quality of potential habitat within the WMUs, and because the WMUs do not provide enough area to be considered a Viable Habitat Area as defined by the USFWS (2013b), there is only moderate potential that the WMUs could support a population of SMHM in their current condition (WRA 2017a). Because there is potential habitat, however, the USFWS was consulted for the SMHM and a Biological Opinion has been issued for this species for the PROJECT.

Conclusion: Impacts on Species

Burrowing Owl

Burrowing owls have been documented in the PROJECT site, therefore there is a potential for impact. Closure of WMUs 14 and 32 would result in permanent removal of potential habitat for this species. Loss of potential habitat would occur though the closure surface remedies and the wildlife exclusion perimeter fence. Wildlife exclusion barriers would preclude burrowing-individuals from entering the WMU 32 footprint. Exclusion of burrowing wildlife would preclude owls from occupying burrows. Surface closure remedies would also eliminate potential habitat for this species at WMUs 14 and 32. In the context of the total amount of marginal potential habitat for this species that is present within the greater facility site (e.g., along relatively undisturbed roads and levees), loss of habitat within the footprint of WMUs 14 and 32 is discountable. Additionally, the WMU 32 wildlife exclusion barriers would be designed and maintained in a manner to preclude any potential for entanglement impacts by flying species. Thus, with the mitigation implementation of Mitigation Measure BIO-2, any potential impacts to burrowing owl would be less than significant.

Suisun Song Sparrow

The Suisun song sparrow has a high potential to occur within WMU 32. Marsh vegetation provides small areas of breeding and foraging habitat for this species. While the species has not been observed in WMU 32, it has been



observed within the Facility by WRA biologists (WRA 2009c). As such, there is a moderate potential for impact on this species. The WMU 32 wildlife exclusion barriers would be designed and maintained in a manner to preclude any potential for entanglement impacts by flying species. Additionally, standard nesting bird pre-construction mitigation is proposed (Mitigation Measure BIO-1) to reduce potentially significant impacts to a level of less than significant. This mitigation would only apply to ground disturbing activities and any necessary vegetation removal activities that occur between February 15 and August 31. Ground disturbance and any necessary vegetation removal that occurs outside of this window would not require additional measures. With the implementation of Mitigation Measure BIO-1 any potential impacts to special-status birds would be less than significant. With the implementation of Mitigation Measure BIO-1, the potential for impact is reduced to less than significant.

Western Pond Turtle

The western pond turtle has a moderate potential to occur within the WMUs 10/11/14, WMU 31, and WMU 32 (WRA 2019a, b). While no western pond turtles have been observed during WRA's site visits, the WMUs contain aquatic features that may support this species and are adjacent to suitable foraging and nesting habitat. This suitable adjacent habitat includes the Clean Water Canal (CWC) and nearby upland habitat, which is adjacent to much of WMU 31. Additionally, while there is no suitable aquatic habitat within the WMU 32, much of the unit is located within 400 meters of Pacheco Creek where western pond turtle has previously occurred (CDFG 2009). Within WMU 32, suitable nesting habitat of pickleweed is located in the southwestern corner of the unit. With the addition of the exclusion structure, during the closure of WMU 32, suitable habitat would be lost and inaccessible; however, the loss of habitat would have the benefit of preventing the species from nesting in potentially waste-impacted soils. The nearest documented occurrence of western pond turtle is approximately 0.5 miles west of the WMUs (CDFW 2017). With the implementation of Mitigation Measure BIO-5, the potential for impact is reduced to less than significant.

California Ridgway's Rail

Although suitable habitat exists within the vicinity of the PROJECT and there are nearby known occurrences of California Ridgway's Rail (CRR), no suitable habitat exists in the PROJECT site and no CRR were observed during surveys. Therefore, there is no potential for CRR individuals to be in the PROJECT site. However, there is potential for PROJECT noise to affect individuals in the Point Edith Wildlife Area outside of the PROJECT site. Due to the potential to affect CRR, there is a potential significant impact on CRR, and USFWS was consulted to mitigate the impact of potential take on CRR. The USACE initiated consultation with the USFWS under Section 7 of the Federal Endangered Species Act on July 16, 2012, regarding impacts to listed species including the CRR. The USFWS issued a Biological Opinion on November 17, 2017 (Appendix D) finding that the PROJECT with mitigation would not result in jeopardy to any listed species. With the implementation of Mitigation Measure BIO-4, the impact is considered less than significant.

Salt Marsh Harvest Mouse

The PROJECT would result in temporary impacts to 5.46 acres of SMHM wetland habitat and 19.18 acres of SMHM upland habitat; these impacts would be restored within 12 to 24 months following the impacts. SMHM habitat restoration would occur concurrently with the mitigation wetland and upland revegetation efforts. A total of 2.96 acres of SMHM wetland habitat and 8.31 acres of seasonal SMHM upland habitat would be permanently impacted. With the implementation of Mitigation Measure BIO-3, this impact would be reduced to less than significant. As noted above, the USFWS has issued a Biological Opinion that includes SMHM for the PROJECT.



Level of Significance Before Mitigation

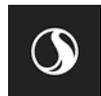
Potentially Significant Impact.

Mitigation Measures

MM BIO-1 Avoid Disturbance of Nesting Special-Status and Non-Special-Status Raptors and other Migratory Birds, including northern harrier, Suisun song sparrow. If construction activities are scheduled during the breeding and/or nesting season (February 15 through August 31), a qualified biologist shall conduct a preconstruction nest survey of suitable nesting habitat. Surveys shall be performed for the PROJECT construction and staging areas and suitable habitat within 250 feet of the PROJECT construction and staging areas in order to locate any active passerine (perching bird) nests and within 500 feet of the PROJECT construction and staging areas to locate any active raptor (birds of prey) nest. The survey shall be conducted not more than 14 calendar days prior to the start of work. If nesting passerines and raptors do not occur within 250 and 500 feet of the PROJECT area, respectively, then no further action is required if construction begins within 14 calendar days. If the survey indicates the potential presence of nesting birds, the biologist shall determine an appropriately sized buffer around the nest and no work will be allowed in this buffer until the young have successfully fledged. The size of the nest buffer will be determined by a qualified biologist and will depend on the species present, the level of noise or construction disturbance, line of sight between the nest and the disturbance, ambient levels of noise and other disturbances, and other topographical or artificial barriers. In general, buffer sizes of up to 300–500 feet for raptors and 50–250 feet for other birds should suffice to prevent disturbance, but these buffers may be increased or decreased, as appropriate, depending on the bird species and the level of disturbance anticipated near the nest.

MM BIO-2 Avoid Disturbance of Burrowing Owls. Because suitable habitat is present on the site and a burrowing owl has been observed in the PROJECT site, preconstruction take avoidance surveys for burrowing owls shall be implemented prior to construction activities. These surveys shall conform to the survey protocol established by the CDFW Staff Report on Burrowing Owl Mitigation. The following measures are consistent with the provisions of the Migratory Bird Treaty Act and the CDFW staff report.

- No more than 14 days prior to any ground disturbing activities (regardless of time of year), a qualified biologist shall conduct a take avoidance survey for burrowing owls. If no owls are found during this first survey, a final survey shall be conducted within 24 hours prior to ground disturbance to confirm that burrowing owls are still absent. If ground disturbing activities are delayed or suspended for more than 14 days after the initial take avoidance survey, the site shall be resurveyed (including the final survey within 24 hours of disturbance). All surveys shall be conducted in accordance with CDFW guidelines.
- If burrowing owls are found on the site during the surveys, mitigation shall be required in accordance with CDFW guidelines. If the surveys identify breeding or wintering burrowing owls on or adjacent to the site, occupied burrows shall not be disturbed and shall be provided with protective buffers. Where avoidance is not feasible, an exclusion plan shall be implemented to encourage owls to move away from the work area prior to construction. The exclusion plan shall be developed in consultation with CDFW and monitoring requirements. Mitigation would include the purchase of mitigation bank credits for burrowing owl foraging habitat at a minimum



1:1 ratio for the loss of suitable foraging habitat caused by the construction of the PROJECT or the preservation of equivalent lands.

MM BIO-3 Avoid and Minimize Impacts to Salt Marsh Harvest Mouse and Suitable SMHM Replacement.

The Applicant shall compensate for the temporary disturbance of 24.64 acres and the permanent loss of 11.27 acres of SMHM habitat by preserving and managing land offsite to conserve the species and to offset temporary and permanent impacts to potential SMHM habitat due to PROJECT activities. A total of 83.09 acres would be preserved through the preservation and management of high quality SMHM habitat in perpetuity at the Cordelia Slough Preserve in Suisun Bay (Solano County, California) as approved by USFWS long-term management plan with a fully funded endowment.

MM BIO-4 Avoid and Minimize Impacts to California Black Rail and Ridgway's rail and Suitable CRR replacement habitat.

The Applicant shall fund the restoration of 5.5 acres of tidal marsh habitat/high tide refuge habitat for the CRR through channel excavation and creation of marsh mounds in the Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge in Sonoma, California, as offsite compensatory mitigation for the effects of the PROJECT on the CRR. The Applicant shall provide the funding prior to the initiation of construction of the PROJECT.

MM BIO-5 General wildlife protection measures for wildlife during construction.

- A qualified biologist will provide Worker Environmental Awareness Training (WEAT) to field management and construction personnel. Communication efforts and training will take place during preconstruction meetings so that construction personnel are aware of their responsibilities and the importance of compliance. WEAT will identify the types of sensitive resources located in the PROJECT area and the measures required to avoid impacts on these resources. Materials covered in the training program will 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 will ensure the new personnel receive WEAT before starting work. A sign-in sheet of those contractor individuals who have received the training will be maintained by the project proponent. A representative will 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. The representative's name and telephone number will be provided to the USFWS before the initiation of ground disturbance.
- If individuals of listed wildlife species may be present and subject to potential injury or mortality from construction activities, a qualified biologist will conduct preconstruction surveys. If a listed wildlife species is discovered, construction activities will not begin in the immediate vicinity of the individual until USFWS and/or CDFW is contacted, and the individual has been allowed to leave the construction area.
- Minimum qualifications for a qualified biologist will be a four-year college degree in biology or related field and demonstrated experience with the species of concern.
- Any special-status species observed during surveys will be reported to the USFWS and CDFW so the observations can be added to the CNDDDB.
- All vehicle operators will limit speed to 15 mph within the PROJECT area.



- Prior to the commencement of construction, the following measures will be conducted in an effort to ensure no wildlife is present in any work area. Prior to removal of vegetation, the qualified biologist will walk the work zone to ensure no wildlife, or their nests, occur within the work zone. In potential protected species habitat areas, vegetation will be removed using a two-step process by which vegetation will be removed to bare ground in a manner to enable and encourage wildlife to move out and away from the construction area. Tall vegetation will first be removed using a walk behind mower with the blade set at a high ground clearance to avoid direct mortality to wildlife. This would allow subsequent removal of vegetation to the ground surface using string trimmers under the supervision of a qualified biologist since visibility of the ground surface would be possible given the short stature of the vegetation. Additionally, to protect western pond turtles, exclusion fencing will be installed prior to construction during turtle nesting season (May 1–August 31) in the work areas adjacent to waterways.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact BIO-2	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations, or by the California Department of Fish or U.S. Fish and Wildlife Service?
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Impact Analysis

The PROJECT site does not contain riparian habitat that is suitable to support sensitive species, and as such does not have a significant impact on changing or altering riparian habitat as a result of the PROJECT.

Due to the PROJECT site being previously used for waste management on the Facility, the PROJECT site represents low quality natural habitat and therefore does not function as a sensitive natural community. The PROJECT site is adjacent to Point Edith Wildlife Area, a 760-acre wildlife area with marshes and sloughs used for waterfowl hunting, accessible only by boat. However, the PROJECT site is not located within any other sensitive natural community identified within a local or regional plan, policy, and regulation, or by CDFW and USFWS. Therefore, the PROJECT would have no impact to sensitive habitats.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



Impact BIO-3 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?

Impact Analysis

The PROJECT would result in impacts to federally and state protected waters, involving both temporary and permanent impacts. Potential impacts on wetlands and waters of the U.S. and the state include direct modifications to jurisdictional waters to accommodate various aspects of proposed improvements, and indirect changes associated with the increased potential for erosion and water quality degradation.

Excavation and cover of wetlands during closure of the PROJECT WMUs would result in permanent impacts to 27.05 acres of jurisdictional waters. The 18.58 acres of impacted area located in WMUs 10, 11 and 31 would be restored² (re-established) within these WMU areas following closure activities, so losses would be temporal in nature. The 8.47 acres of impacted area within WMUs 14 and 32 will be permanently lost due to construction of Title 27 covers. To offset the wetland impacts the Applicant will restore wetlands onsite, has acquired and completed grading on, and dedication of a property referred to here as the Suisun Properties land to the John Muir Land Trust for incorporation into the Lower Walnut Creek Restoration Project (Restoration Project), and has purchased 8.47 acres of wetland credits at Wildland's North Suisun Mitigation Bank. The offsite Suisun Properties parcel is a 19-acre site that abuts the Suisun Bay and is adjacent to the site for the Lower Walnut Creek Restoration Project, a watershed enhancement project developed in partnership between the John Muir Land Trust and the Contra Costa County Flood Control and Water Conservation District. As part of the Lower Walnut Creek Restoration Project, the Applicant removed the existing infrastructure and debris on the site and graded 8.60 acres to an elevation that allows for the future hydrologic connection with the Lower Walnut Creek Restoration site. The Lower Walnut Creek Restoration Project was evaluated in the County ISMND.

Avoided wetlands would be separated from the developed area by a sufficient buffer distance to avoid indirect hydrological impacts. With the implementation of mitigation measures such as those outlined in Mitigation Measure BIO-6 and Mitigation Measure BIO-7, impacts would be reduced to a level of less than significant.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM BIO-6 Mitigate for Permanent Impacts to Waters of the U.S. and/or Waters of the State. The Applicant shall replace on a "no net loss" basis (minimum 1:1 ratio) (in accordance with USACE and/or SFBRWQCB) the acreage and function of the 27.05 acres of wetlands and other waters that would be removed as a result of PROJECT implementation. To mitigate the wetland impacts the Applicant will restore³ (re-established) wetlands onsite, has acquired and completed grading on, and dedication of a property referred to here as the Suisun Properties land to the John Muir Land Trust for incorporation into the Lower Walnut Creek Restoration Project (Restoration Project), and has purchased 8.47 acres of wetland credits at Wildland's North Suisun Mitigation Bank. The offsite Suisun Properties parcel is a 19-acre site that abuts the Suisun Bay and is adjacent to the site for

² Success criteria for the restored wetlands shall be defined as part of compliance with Mitigation Measure BIO 7. See Section 5.4, Biological Resources, of this ISMND.



the Lower Walnut Creek Restoration Project, a watershed enhancement project developed in partnership between the John Muir Land Trust and the Contra Costa County Flood Control and Water Conservation District. The Applicant removed existing infrastructure and debris from the site and graded 8.60 acres to an elevation that allows for the future hydrologic connection with the Lower Walnut Creek Restoration site. The Applicant transferred the parcel to the John Muir Land Trust following completion of the grading. The work on this parcel is part of the County Flood Control and the Water Conservation District's Lower Walnut Creek Restoration Project and was evaluated in the County ISMND.

MM BIO-7 Mitigation and Monitoring Plan. The Applicant has developed a Mitigation and Monitoring Plan describing the methods for restoring the 18.58 acres of excavated wetlands in WMUs 10, 11, and 31, describing success criteria for the restored wetlands and the monitoring requirements. More specifically, the Plan includes a description of protocols for monitoring vegetation and geomorphology to evaluate PROJECT performance, monitoring schedule, performance criteria and thresholds that would trigger adaptive management actions, and reporting, until the success criteria are obtained. The Plan will be subject to approval by USFWS, the USACE, SFBRWQCB, and BCDC prior to the start of construction. An annual report shall be prepared and provided to the above-listed regulatory agencies in each year that post-construction monitoring is conducted.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact BIO-4 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?

Impact Analysis

Wildlife movement corridors are important habitats that allow wildlife to travel, migrate, or disperse between significant habitats (Harris and Gallagher 1989). Wildlife movement corridors have been recognized by federal agencies such as the USFWS and the State of California as important habitats worthy of conservation. In general, movement corridors are comprised of areas of undisturbed land cover that connects larger, contiguous habitats.

Due to the site being previously used for Facility waste management, the WMUs portion of the PROJECT site represents low quality wildlife habitat (WRA 2017). The WMUs portion of the PROJECT site is not in itself important habitat and does not provide connectivity to other important habitats worthy of conservation. Additionally, closure of WMU 32 would create a wildlife barrier around the unit's footprint. Any wildlife movement around the WMU footprint would be limited to common wildlife species that are already tolerant of industrial/developed and highly disturbed land covers. The WMU 32 barrier is not a complete barrier to movement, and connectivity of existing habitat will remain to the north and south of the WMU 32 footprint. As stated above, the PROJECT site is adjacent to Point Edith Wildlife Area, a 760-acre wildlife area with marshes and sloughs used for waterfowl hunting that is accessible only by boat. However, because no connectivity exists for these species, the PROJECT would not interfere with the movement of any wildlife species.

Additionally, as the PROJECT would not build any permanent roads or other linear barriers to movement, the PROJECT would not interfere with the movement of any wildlife species.



Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact BIO-5 Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

Impact Analysis

The PROJECT would not conflict with the Contra Costa County Ordinance Code Chapter 816-6 “*Tree Protection and Preservation.*” WMU 31 currently has approximately 18 palm trees (*Phoenix* spp.), some of which are protected trees, as defined by the following: a protected tree is defined as any tree on developed property within any commercial, professional office, or industrial district within unincorporated Contra Costa County, measuring 20 inches or larger (measured at four and a half feet from ground level) in circumference (6.4 inches diameter), or any multi-stemmed tree measuring 40 inches or larger (measured at four and a half feet from ground level) in circumference (12.7 inches diameter). However, the trees on WMU 31 are planned for removal as part of another project that would occur prior to construction of the PROJECT. Therefore, the appropriate baseline condition for this analysis assumes that trees are not on-site. Tree removal activities are not proposed as part of the PROJECT and are not considered in the ISMND. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact BIO-6 Conflict with the provisions of an adopted habitat conservation plan, natural community conservation plan, or other approved local, regional, or State habitat conservation plan?

Impact Analysis

The PROJECT would not conflict with local ordinances relative to biological resources. The PROJECT site is not subject to a Habitat Conservation Plan, or other approved local, regional, or State plans. The PROJECT does not conflict with the goals presented in the Contra Costa County General Plan. As such, the PROJECT would not conflict



with any approved or planned local policies or ordinances protecting biological resources. Therefore, there would be no impact and no mitigation would be required.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.5 CULTURAL RESOURCES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Disturb any human remains, including those interred outside of formal cemeteries?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.5.1 Environmental Setting

The PROJECT site is located approximately two miles east of the Benicia-Martinez Bridge and I-680, at the north end of the Facility, in Contra Costa County. The PROJECT area is located on the USGS Vine Hill 7.5-minute topographical quadrangle (Township 2N, Range 2W, Section 10; 1980) at approximately 38° 2' 2.87" N, 122° 4' 13.36" W. The PROJECT site is located adjacent to Suisun Bay, which is connected to San Pablo Bay by the Carquinez Strait.

The PROJECT area is in the lower Suisun Bay near the southern border of the Suisun Bay/ Sacramento River Delta in unincorporated Contra Costa County, within the larger San Francisco Bay Area. The region in which the PROJECT is located has a Mediterranean climate and supports a variety of wetland communities and grasslands.

Prehistoric Setting

Milliken et al. (2007) present a series of culture changes in the San Francisco Bay Area. The period of occupation during the 11,500 to 8,000 calibrated (cal) B.C. time frame, when Clovis big-game hunters, then initial Holocene gatherers, presumably lived in the area, lacks evidence, presumably because it has been washed away by stream action, buried under more recent alluvium, or submerged on the continental shelf (Rosenthal and Meyer 2004:1). However, there is evidence for an in-place forager economic pattern, beginning around 8000 cal B.C., followed by a series of five cycles of change that began at approximately 3500 cal B.C.

Lower Archaic (8000 to 3500 cal B.P.) – Between cal 8000 and 3500 B.C., the Bay Area appears to have been occupied by a widespread but sparse population of hunter-gatherers. The millingslab and handstone, as well as a variety of large, wide-stemmed, and leaf-shaped projectile points, all emerged during this period (Milliken et al. 2007:114).

Middle Archaic (3500 to 500 cal B.P.) – Several technological and social developments characterize this period in the Bay Area. Rectangular *Haliotis* and *Olivella* shell beads, the markers of the Early Period bead horizon, continued in use until at least 2,800 years ago (Ingram 1998). Wallace and Lathrop 1975:19). The mortar and pestle were first documented in the Bay Area shortly after 4000 B.C., and by 1500 cal B.C., cobble mortars and pestles, and not millingslabs and handstones, were used at sites throughout the Bay Area, including CA-ALA-307 (West Berkeley), and ALA-483 (Livermore Valley) (Wiberg 1996:373). In the central Bay Area, burial complexes with ornamental grave associations and elliptical house floors with postholes characterized the Lower Berkeley Pattern. These features represent a movement from forager to semi-sedentary land use (Milliken et al. 2007:115).



Upper Archaic (500 cal B.P. to cal Anno Domini [A.D.] 1050) – The Upper Archaic period shows continued specialization and an increase in the complexity of technology. Acorns and fish are the predominant food sources. New bone tools and ornaments appear, including whistles and barbless fish spears. Beads become prominent, with several types and varieties produced. Mortars and pestles continue to be the sole grinding tools utilized. Net sinkers disappear at most sites in the region. Mortuary practices change from a flexed position to an extended position.

Emergent (cal A.D. 1050 to Historic) – A new level of sedentism, status ascription, and ceremonial integration in lowland central California arose during this period. During the Middle/Late Transition bead horizon, around cal A.D. 1000 (Milliken et al. 2007:116), burial objects became much more elaborate, and initial markers of the Augustine Pattern appeared, including multiperforated and bar-scored *Haliotis* ornaments and new *Olivella* bead types.

Obsidian production and mortuary practices both provide evidence for increased social stratification after 1250 A.D. Napa Valley obsidian manufacturing debris increased dramatically in the interior East Bay (Milliken et al. 2007:117); while with burials, although the quantity of shell beads contained in burials decreased, the quality of burial items increased in high-status burials and cremations (Fredrickson 1974:62). This development may have reflected a new regional ceremonial system that was the precursor of the ethnographic Kuksu cult, a ceremonial system that unified the many language groups around the Bay during Bead Horizon L1 (Fredrickson 1994:66, Bennyhoff 1994:70, 72 in Milliken et al. 2007:117).

An upward cycle of regional integration was likely commencing when it was interrupted by Spanish settlement in the Bay Area beginning in 1776. Such regional integration was a continuing characteristic of the Augustine Pattern, most likely brought to the Bay Area by Patwin speakers from Oregon, who introduced new tools (such as the bow) and traits (such as pre-interment grave-pit burning) into central California. Perhaps the Augustine Pattern, with its inferred shared regional religious and ceremonial organization, was developed as a means of overcoming insularity, not in the core area of one language group, but in an area where many neighboring language groups were in contact (Milliken et al. 2007:118).

Ethnographic Setting

Martinez is within the broad territory occupied by the Native American group known to the Spanish and twentieth-century ethnographers as the Costanoan (Levy 1978). Costanoan peoples occupied the coast of California from San Francisco to Monterey, and inland to include the coastal mountains from the southern side of the Carquinez Strait to the eastern side of the Salinas River south of Chalone Creek. Costanoan actually refers to a group of eight related languages belonging to the Penutian linguistic family. Each language was spoken by a different ethnic group within a recognized geographical area. The contemporary descendants of the Bay Area branches of this group are members of the Ohlone Indian Tribe, and the name Ohlone is used in this document to include the members of several Bay Area ethnic groups, including those from the immediate PROJECT area.

Martinez is in the area that was occupied by speakers of the Karkin (or Carquin) language. Karkin was the largest of the four villages where this language was spoken, and the name of the village was given to both the language and the Straits upon which the villages were located (Cook 1957).

As in most of California, the politically autonomous units within each Ohlone ethnic group have been classified as “tribelet,” as per ethnographer Alfred L. Kroeber’s influential *Handbook of the Indians of California* (1925). Tribelet population varied from 50 to 500 with the average being about 200 people. Each Ohlone tribelet had one or more permanent villages and several temporary camps within its territory. Collecting and hunting parties lived in temporary camps when obtaining seasonally available resources within the tribelet territory away from the village. Tribelet territorial boundaries were strictly observed, with infringement of territorial rights being the most frequent cause of war



between tribelets. Members of each tribelet identified themselves with the principal village; there was no overarching recognition of multiple tribelets belonging to a larger Ohlone group. Each tribelet had a chief, whose office was inherited patrilineally. The chief's duties included feeding visitors, directing ceremonial activities, organizing hunting, fishing, and gathering activities, and directing warfare expeditions. The chief generally did not have coercive powers, except during times of war. The chief and a council of elders advised the people and attempted to achieve consensus in important community matters (Levy 1978).

Historic Setting

The Mexican government secularized the missions in the early 1830s. Former mission lands were granted to soldiers and other Mexican citizens, primarily for use as cattle ranches. The Martinez area was originally part of two Mexican land grants. The Rancho El Pinole was granted to Ygnacio Martinez in 1824 (Martinez Historical Society 2018). The eastern boundary of this grant was Alhambra Creek, which runs through the modern city of Martinez. The area east of Alhambra Creek was provisionally granted to Scotsman William Welch in 1844 as part of Rancho Las Juntas, or the Welch Rancho (Diablo Valley College 2021). Ranching continued following the signing of the Treaty of Guadalupe Hidalgo granting Alta California to the United States in 1848.

The Gold Rush of 1849 brought large numbers of Anglo-Americans to the Bay Area, resulting in the rapid expansion of San Francisco, which became the commercial hub for the region. Other towns in the Bay Area, such as Oakland and San Jose, developed quickly after the arrival of the Southern Pacific transcontinental railroad in 1869 (Beck and Haase 1974). These Bay Area towns provided commercial, warehousing, financial, and manufacturing services for the agricultural and mining areas further east.

In 1847, ferry service was established across the Carquinez Strait between what would later become Martinez and Benicia. This quickly became an integral part of the main route from San Francisco to the gold mining areas in the Sierras, and the area developed rapidly by providing supplies and other services to the gold miners using the ferry route. Further development ensued when the legislature designated Martinez as the county seat of Contra Costa County in 1851 (Martinez Historical Society 2018).

Although the initial growth of the Martinez area was based on the Gold Rush, sustained development came from agriculture. The principal commodities were wheat and fruit, as well as cattle. The establishment of rail service through Martinez in 1877 facilitated widespread shipping of local agricultural products (Martinez Historical Society 2018).

Martinez became an industrial center in the early twentieth century when chemical and petroleum facilities were built. Associated Oil opened their refinery at Avon in 1913. The Martinez location provided a deep-water harbor and rail connections for these facilities. As industrial businesses grew, local agricultural lands were converted to housing for refinery and chemical plant workers (Martinez Historical Society 2018). The Facility has been operating for more than 100 years and is expected to remain in operation for the foreseeable future.

5.5.2 Methodology

The cultural resources investigations carried out for the PROJECT included background research conducted at the Northwest Information Center (NWIC) of the California Historical Resources Information System, consultation opportunity for Native American Tribes (Appendix E and Section 5.18, Tribal Cultural Resources) and a review of historic maps and ethnographic documents.



Record Search and Literature Review

The California Historical Resources Information System maintains regional offices that manage site records for known cultural resource locations and related technical studies. The regional office for Contra Costa County is the NWIC, located at Sonoma State University in Rohnert Park. Information regarding cultural resource studies and archaeological sites was compiled using a 0.25-mile search radius around the PROJECT. Sources reviewed include all known and recorded archaeological and historic sites, and cultural resource reports. Additional resources consulted for relevant information include the National Register of Historic Places, the California Register of Historical Resources, the California Inventory of Historic Resources, the California Points of Historical Interest, California Historical Landmarks, and historic maps.

The record search for the PROJECT was requested on September 21, 2021, and was completed on October 7, 2021 (NWIC File # 18-0646). The NWIC did not identify any previously recorded resources within the PROJECT or within a 0.25-mile radius of the PROJECT area. Additionally, the NWIC did not identify any studies conducted within the PROJECT area and identified three studies conducted within a 0.25-mile radius of the PROJECT area, West and Schultz 1975 (S-051681), Self 2001 (S-23920), and Tremaine 2009 (S-38006). None of these studies included field surveys that covered any portion of the PROJECT area.

Four previous technical studies conducted within the Facility-owned portion of the PROJECT area (that were not on file at the NWIC) were provided to Stantec. Three of the studies were conducted by URS (2008 a, b, and c) and included a records search, Native American Tribe consultation opportunity, and survey of the current Facility-owned portion of the PROJECT area (WMUs 10/11/14, 31, and 32). Two of the three studies resulted in negative findings for cultural resources in the PROJECT area, while the other (URS 2008b) identified a small historic structure within WMU 31. This resource was recommended ineligible by the study and has since been demolished; no structures are present within the WMU 31 PROJECT area. One additional study was conducted by Basin Research Associates, Inc. (2014) for WMU 32 which included an archaeological survey, records search, and consultation. The study resulted in negative findings for cultural resources in WMU 32.

Native American Correspondence

The SFBRWQCB sent a request to the California Native American Heritage Commission (NAHC) in June 2018, requesting a list of Native American contacts for the PROJECT area and requesting a search of the NAHC's Sacred Lands File. The NAHC responded to the request and provided a list of Native American contacts and indicated that there are no known Sacred Sites listed in their Sacred Lands File for the PROJECT area. Additionally, the NAHC included a list of individuals and tribes affiliated with the area.

There is one Native American Tribe that is traditionally and culturally affiliated with the geographic area of the PROJECT that has requested that the SFBRWQCB provide written notification of projects pursuant to AB 52: Wilton Rancheria. On July 6, 2018, the SFBRWQCB sent notification of the PROJECT to Wilton Rancheria. The notification provided Wilton Rancheria with 30 days from receipt of the letter to request consultation. The SFBRWQCB did not receive a request for consultation.

5.5.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact CUL-1 Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?

Impact Analysis

There are no recorded historical resources, as defined in CEQA Guidelines Section 15064.5, located within the PROJECT area. The WMUs that comprise the PROJECT are inactive WMUs that were created by the construction of berms made of native soil and fill, to create containment cells for waste material. The PROJECT site is located in an industrial area of Contra Costa County that has been previously developed with the necessary infrastructure to support operation of the Facility. The WMUs have been previously disturbed by industrial activities associated with the Facility. Therefore, there is no likelihood of a historical resource being discovered during ground-disturbing PROJECT activities.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact CUL-2 Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?

Impact Analysis

There are no recorded archaeological resources, pursuant to CEQA Guidelines Section 15064.5, located within the PROJECT area. The WMUs that comprise the PROJECT are inactive WMUs that were created by the construction of berms made of native soil and fill, to create containment cells for waste material. Therefore, the likelihood of an archaeological resource being discovered during ground-disturbing PROJECT activities (e.g., excavation of waste material, the installation of shear panel walls backfilled with slurry, and/or grading) is very minimal, as the above-mentioned activities would disturb mostly landfill debris, imported soil covers, and staging areas, and would involve little or no disturbance of native soils.

However, if an inadvertent discovery were to occur, it could result in damage to the resource that would cause a substantial adverse change in its significance, thereby constituting a significant impact. Prehistoric resources might include obsidian and chert flaked-stone tools (e.g., projectile points, knives, scrapers) or toolmaking debris; culturally darkened soil ("midden") containing heat-affected rocks, artifacts, or shellfish remains; and stone milling equipment (e.g., mortars, pestles, handstones, or milling slabs); and battered stone tools, such as hammerstones and pitted stones. Historic-period resources in this locale might include shipwreck remains, including wood, iron, and steel-hulled ships, as well as smaller ferrous materials such as anchors, iron ballast, chain, iron hull fasteners, rigging, and fittings of various types. Other historic-period materials could include debris scatters of ceramic, glass, or metal containers; household or personal items; privy pits; or building foundations or other structural remains. The implementation of Mitigation Measures CUL-1 and CUL-2 would reduce to a less than significant level any potential



impacts from inadvertent discovery of either a historical resource or a unique archaeological resource at WMUs 10/11/14, 31, and 32.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measure

MM CUL-1 Cultural Materials Discovered During Construction. If evidence of any prehistoric or historic-era subsurface archaeological features or deposits are discovered during excavation or other earth-moving activities, all ground disturbing activity in the area of the discovery shall be halted until a qualified archaeologist can assess the significance of the find. Should an unanticipated discovery be made, avoidance is the preferred treatment (CEQA Guidelines, §15126.4(b)(3)(A)), but if the site cannot be avoided in place, then the site shall be further evaluated. Immediately upon discovery of a find, a qualified archaeologist shall evaluate the significance of the newly discovered site or unanticipated discovery along with attempted consultation with designated Native American representatives to provide proper management recommendations. A qualified archaeologist shall follow accepted professional standards in recording any find, including submittal of the standard California Department of Parks and Recreation Primary Record forms (Form DPR 523) and location information to the NWIC. The consulting archaeologist shall also evaluate such resources for significance per California Register of Historical Resources eligibility criteria (PRC § 5024.1; Title 14 CCR § 4852). If the archaeologist determines that the find does contain temporally diagnostic materials and does not meet the California Register of Historical Resources standards of significance for cultural resources, construction may proceed. If the archaeologist determines that further information is needed to evaluate significance, the lead agency shall be notified, and a data recovery plan shall be prepared.

MM CUL-2 Worker Awareness Training. Prior to the start of construction, all field personnel shall receive worker's environmental awareness training on cultural resources. The training, which may be conducted with other environmental or safety trainings, will provide a description of cultural resources that may be encountered during construction and outline the steps to follow in the event that a discovery is made.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact CUL-3 Disturb any human remains, including those interred outside of dedicated cemeteries?

Impact Analysis

There is a low likelihood of encountering buried human remains during ground-disturbing PROJECT activities. None have been reported in the PROJECT vicinity, and the filled and heavily developed former tidal marshland on which the Facility has been built has a low sensitivity for preservation of such remains. Nonetheless, the accidental disturbance of human remains would constitute a significant impact. Therefore, Mitigation Measure CUL-3 would reduce any potential impacts from an inadvertent discovery to a less than significant level.



Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measure

MM CUL-3 Human Burials Encountered During Construction. The treatment of human remains and any associated or unassociated funerary objects discovered during any ground-disturbing activity shall comply with applicable State law. PROJECT personnel shall be alerted to the possibility of encountering human remains during PROJECT implementation and apprised of the proper procedures to follow in the event they are found.

State law requires immediate notification of the County coroner upon discovery of human remains; in the event of the coroner's determination that the human remains are Native American, the NAHC would be notified, which would appoint a Most Likely Descendent (PRC Section 5097.98). The Most Likely Descendent would make all reasonable efforts to develop an agreement for the treatment, with appropriate dignity, of human remains and associated or unassociated funerary objects (CEQA Guidelines Section 15064.5[d]). The agreement shall take into consideration the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. The PRC allows 48 hours to reach agreement on these matters. If the Most Likely Descendent and the other parties do not agree on the treatment and disposition of the remains and funerary objects, the SFBRWQCB shall follow PRC Section 5097.98(b), which states that "the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance".

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.



5.6 ENERGY

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5.6.1 Environmental Setting

Pacific Gas and Electric (PG&E) provides electricity and natural gas service to Contra Costa County. Electricity to the PROJECT site is currently provided by PG&E. In February 2018, PG&E announced that it had reached California’s 2020 renewable energy goal three years ahead of schedule, and now delivers nearly 80 percent of its electricity from GHG free resources. Approximately 29 percent of PG&E’s electricity came from renewable resources including solar, wind, geothermal, biomass and small hydroelectric sources in 2019. Additionally, 98 percent of PG&E’s total electric power mix is from GHG-free sources including nuclear, large hydroelectric, and renewable sources of energy (PG&E 2021).

5.6.2 Methodology

The energy requirements for the PROJECT were determined using the construction and operational estimates generated from the Air Quality Analysis (refer to Appendix B). Short-term construction energy consumption is discussed below.

Short-Term Construction

Off-Road Equipment

The PROJECT is anticipated to be constructed over eight years with a construction start expected in 2024. Table 5.6-1 provides estimates of the PROJECT’S construction fuel consumption from off-road construction equipment. As shown in Table 5.6-1, construction activities associated with the PROJECT would be estimated to consume 122,128 gallons of diesel fuel.

Table 5.6-1. Construction Off-Road Fuel Consumption

Phase	Fuel Consumption (gallons)
Year 1	12,044
Year 2	16,460
Year 3	17,409
Year 4	17,409
Year 5	17,409
Year 6	7,157
Year 7	19,388



Phase	Fuel Consumption (gallons)
Year 8	14,851
Total	122,128

Note: Totals may not sum due to rounding.
Source: Stantec Consulting Services Inc. 2023 (Appendix B).

There are no unusual PROJECT characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in other parts of the state. Therefore, it is expected that construction fuel consumption associated with the PROJECT would not be any more inefficient, wasteful, or unnecessary than at other construction sites in the region. Furthermore, the PROJECT would require Tier 4 diesel engine standards for several of the off-road equipment and heavy-duty diesel trucks, which would reduce potential air quality impacts and would have the co-benefit of reducing fuel consumption.

On-Road Vehicles

On-road vehicles for construction workers, vendors, and haulers would require fuel for travel to and from the PROJECT site during construction. Table 5.6-2 provides an estimate of the total on-road vehicle fuel usage during construction. There are no unusual PROJECT characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in other parts of the state. Therefore, it is expected that construction fuel consumption associated with the PROJECT would not be any more inefficient, wasteful, or unnecessary than at other construction sites in the region.

Table 5.6-2. Construction On-Road Fuel Consumption

Phase	Fuel Consumption (gallons)
Year 1	20,644
Year 2	30,324
Year 3	33,647
Year 4	33,647
Year 5	33,647
Year 6	19,697
Year 7	32,416
Year 8	22,574
Total	226,598

Note: Totals may not sum due to rounding.
Source: Stantec Consulting Services Inc. 2023 (Appendix B).

5.6.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact EN-1 Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?

Impact Analysis

This impact addresses the energy consumption from both the short-term construction and long-term operations and are discussed separately below.

Construction Energy Demand

As summarized in Table 5.6-1 and Table 5.6-2, the PROJECT would require 122,128 gallons of diesel fuel for construction off-road equipment and 226,598 gallons of gasoline for on-road vehicles during construction. The PROJECT has incorporated Tier 4 engine standards for several off-road equipment and 2015 or newer heavy-duty diesel trucks, as defined in Appendix B. This feature would serve to reduce the amount of fuel consumed by the PROJECT.

There are no unusual PROJECT characteristics that would necessitate the use of construction equipment that would be less energy-efficient than at comparable construction sites in other parts of the state. Furthermore, the PROJECT would be implementing idling restrictions and encouraging construction workers to carpool to the work site. Therefore, it is expected that construction fuel consumption associated with the PROJECT would not be any more inefficient, wasteful, or unnecessary than at other construction sites in the region.

Long-Term Energy Demand

Maintenance of the PROJECT WMUs would be performed by existing employees, thus there is no anticipated increase in operational emissions associated with ongoing maintenance. The PROJECT does include an LFG system to handle potential gas that could be generated due to the decomposition of consolidated waste beneath the WMU 14 cap. Gas generated beneath the impermeable cap will be passively vented through the gravel geotextile layer. These activities would have no increase on energy demand; therefore, impacts would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact EN-2 Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

Impact Analysis

Contra Costa County's Climate Action Plan (CAP) provides several renewable energy and energy reduction strategies. The majority of the reduction strategies presented in the CAP are only applicable to the operational phase



of a project and therefore are not relevant to the PROJECT. However, the CAP does include goals to reduce transportation emissions from both on-road and off-road vehicles, specifically, by operating cleaner, more efficient vehicles and equipment. As shown in the PROJECT design and Appendix B, Tier 4 engine standards are required for many off-road construction equipment and large heavy-duty diesel trucks used for the material hauling and on-site watering would be 2015 or newer. As such, the PROJECT is consistent with the applicable CAP measure for cleaner, more efficient vehicles and equipment. Furthermore, the PROJECT would be implementing idling restrictions and encouraging construction workers to carpool to the work site. For the above reasons, the PROJECT would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency. As such, the impact is less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.7 GEOLOGY AND SOILS

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death, involving:	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Strong seismic ground shaking?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iii) Seismic-related ground failure, including liquefaction?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Landslides?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Result in substantial soil erosion or the loss of topsoil?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Be located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial direct or indirect risks to life or property?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.7.1 Environmental Setting

The PROJECT site is located on predominantly flat land and lies between approximately 3 feet below mean sea level (msl) to 5 feet above msl. The information in this section is primarily based on the review of the draft CPCMP and basis of design reports prepared for the WMUs.

Fault Systems

The San Francisco Bay Area is considered a high seismically active region. The PROJECT site is located approximately 550 feet east of the adjacent Avon section of the Concord-Green Valley Fault system, which runs underneath the Lower Walnut Creek channel. The creek channel and adjacent refinery area, including WMU 31 and



32, are considered an earthquake fault zone. WMU 10/11/14 are located immediately east of the fault zone (DOC 2015). The Concord Fault is an active fault with activity within the last 200 years; the most recent historic damaging earthquake was in 1955 (Contra Costa County 2005). Additionally, the Green Valley Fault is another Alquist-Priolo Earthquake Fault located approximately 3 miles north of the PROJECT site across Suisun Bay; it is classified as a Holocene fault that has had displacement within the past 11,700 years. There are also several other fault zones within Contra Costa County. The closest are the Holocene era Clayton Fault located approximately 7 miles southeast of the PROJECT site and the Quaternary era Franklin Fault zone approximately 5 miles west of the PROJECT site (DOC 2010).

Surface Rupture

Surface fault rupture occurs when a fault rupture extends through the ground surface. Surface ruptures primarily occur along pre-existing fault zones and Alquist-Priolo Earthquake Fault Zones indicate areas where surface fault ruptures are the most likely during an earthquake. The Concord fault is a northwest striking, right lateral strike slip fault zone part of the San Andreas fault system in the California coast ranges. It extends for about 18 km along the edge of Ygnacio Valley from the base of Mount Diablo to Suisun Bay (DOC 1992). The northern section of the Concord Fault is located about 200 feet to over 2,200 feet from the PROJECT site (DOC 1993).

Ground Shaking

Earthquake ground shaking intensity is measured using the Modified Mercalli Intensity scale, which is a qualitative measure based on impacts on persons, structures, and material. The scale ranges from an intensity of I, which indicates an earthquake is not felt, to XII, which indicates all construction is damaged. An intensity of IV to XII can cause moderate to severe levels of damage. The PROJECT site consists of modern sediment of San Francisco Bay Estuary and Delta lowlands. The General Plan classifies the PROJECT site stability as poor due to weak, water saturated deposits (Contra Costa County 2005). The strongest Modified Mercalli Intensity response in the PROJECT area would occur due to a seismic event along the Concord-Southern Green Valley Fault System. The Association of Bay Area Governments (ABAG) estimates that a magnitude 8.8 event would result in Modified Mercalli Intensity with violent ground shaking. Seismic activity along other faults within the San Francisco Bay Area would also result in noticeable but less severe ground shaking (ABAG 2023).

Liquefaction

Liquefaction is a phenomenon when soil has a temporary loss of shear strength because of increased water pressure between soil grains under stresses associated with earthquakes. This loss of strength results in the sediment behaving like a liquid, which can result in lateral spreading and a loss of bearing strength. For liquefaction to occur, there needs to be loose, granular sediment that is saturated with water and strong seismic shaking. The San Francisco Bay Area is particularly susceptible due to the extent of land created using dredged material and the high potential for seismic activity (USGS 2021). The Vine Hill Quadrangle has not yet been evaluated for its liquefaction potential by the California Geological Survey. However, the General Plan classifies the PROJECT site as having a generally high liquefaction potential based on known geological conditions (Contra Costa County 2005).

Lateral Spreading

Lateral spreading are landslides that occur on gentle slopes and have a fluid-like movement. Liquefaction can result in soil weakness that results in lateral spreading. Based on the County's General Plan, reclaimed wetlands and marsh fill areas are major geologic hazards in the County. Reclaimed wetlands, whether filled or not, experience



amplified lateral and vertical movements, which can be damaging to structures, utilities, and transportation routes and facilities (Contra Costa County 2005).

Landslides

Landslides are typically associated with steep slopes over 15 percent and with old landslide deposits. The PROJECT area is relatively flat and there are no slopes over 26 percent (Contra Costa County 2005). There is no evidence of debris-flow activity in the PROJECT area or old landslide deposits. However, the PROJECT site contains filled, reclaimed material, which is known to be susceptible to landslides. The PROJECT area has been classified as marginally susceptible to landslides due to the weakness of the bay fill material, but the gentle slope of the PROJECT site limits the risk of landslides (Hayden 1995).

WMUs 10/11/14

The subsurface materials at WMUs 10/11/14 can be characterized into six distinct units: waste material, coke, organics (e.g., highly organic silt and clay or bay peat), Young Bay Mud (YBM), Old Bay Clay, and alluvium. The waste material within WMUs 10/11/14 appears as a black sludge mixed with soil. Generally, the waste material is soft, wet, and dark brown to black, with minor traces of organic material.

Beneath the waste material is a distinct layer of coke separating the waste material from the underlying native sediments. Based on boring logs, cross-sections and recent investigations the coke at WMUs 10/11/14 is generally fine to medium grained in texture and ranges in thickness from approximately 1 to 5 feet. Although its thickness varies, the coke is generally continuous across WMUs 10/11/14.

Given that the site was a former marsh, the thickness of organic material and YBM varies significantly between investigation locations. Native organic soils underlie the waste material and coke in most portions of the site. These soils are typically very compressible, are highly plastic, and have very high-water contents, in the range of 75 to 200 percent and are described as very weak soils based on their strength. YBM was encountered in some areas below the organics and is likely mixed with organic soils near the upper contact of the YBM. YBM thickness is estimated to range from approximately 4 to 10 feet. YBM is predominantly clay that exhibits lower water contents, higher fines content, and higher specific gravities than the organic soils. YBM is also considered weak and compressible in absolute terms.

Old Bay Clay and alluvium underlie the native low strength, highly compressible soils described above. The Old Bay Clay and alluvium have still lower water contents and higher dry unit weights and are stronger and less compressible than the overlying soils.

WMU 31

The WMU 31 ground surface is underlain by a thick and compressible peat layer, which is in turn underlain by soft bay mud. The physical delineation between waste material and underlying native sediments is difficult to discern in the field in some areas of WMU 31. In some locations the native sediments have been impacted by constituents of concern that have migrated from the waste material into the native sediments.

WMU 32

WMU 32 has a surface elevation that ranges from approximately 2 to 10 feet above msl. The WMU is underlain by lithologic units, fill, waste, and residual acid tar encountered within and in the vicinity of WMU 32. Fill is a mix of native



and non-native materials placed by the Facility at or near ground surface present at varying depths ranging from ground surface to 8 feet below ground surface (bgs).

Bay sediments are organic to highly organic clays and silts with relatively minor sand deposits and are present at varying depths ranging from ground surface to 55 feet bgs. Older alluvium primarily consists of silty clays and clays with layers of coarse sands and gravels. In the vicinity of WMU 32, the older alluvium is encountered at varying depths ranging from 10 to more than 100 feet bgs. Waste is generally located within the operational boundary of WMU 32 and has been encountered at varying depths ranging from ground surface to 12 feet bgs. Residual Acid Tar from historic operations is encountered at depths of about 5 feet bgs within the southern portion of WMU 32 and up to 45 feet bgs southwest of WMU 32 toward Lower Walnut Creek.

Paleontological Setting

To determine the potential for paleontological resources in the PROJECT area, geologic units from maps of the area were analyzed for their potential paleontological sensitivity based on existing literature and known localities. The paleontological database at the University of California, Berkeley's Museum of Paleontology (UCMP) was consulted, and the Society of Vertebrate Paleontology (SVP) guidelines (SVP 1996, 2010) were followed while conducting the paleontological review.

The UCMP database search did not identify any paleontological resources within the PROJECT area. The closest vertebrate fossil sites to the PROJECT include an assemblage located approximately 2.5 miles east in the Port Chicago Clay Pits, part of the Pleistocene-age Montezuma Formation. The next nearest is approximately 3.5 miles south in Pacheco, located in Riverbank Formation, Middle Pleistocene-aged deposits of granitic sand over stratified silts (UCMP 2018).

The soil in WMUs 10/11/14 and the Oily Skim Pond segment of WMU 31 consists of Joice muck, which is found in flat saltwater marshes such as the Suisun Marsh (USDA 2023a). The soil in the rest of WMU 31 and in WMU 32 consists of Omni silty clay, which is found in nearly level concave basin areas at low elevations (USDA 2023b). The geologic age of the PROJECT WMUs is Quaternary alluvium and marine deposits (Pliocene to Holocene) (USGS 2018). These recent soils do not contain strata known to be geologically sensitive for the presence of paleontological resources (e.g., Plio-Pleistocene age sedimentary rock). Combined with the fact that no vertebrate fossils have been recovered from in or near the PROJECT site, the PROJECT area has a low potential for paleontological resources.

5.7.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Safety Element of the General Plan, DOC geological and earthquake mapping resources, and Section 2.0, Project Description, of this ISMND.

5.7.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact GEO-1	Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death, involving: <ul style="list-style-type: none">i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.ii) Strong seismic ground shaking?iii) Seismic-related ground failure, including liquefaction?iv) Landslides?
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Impact Analysis

A portion of the PROJECT site lies within the Concord Fault Zone with traces of the fault passing less than 1,000 feet of WMUs 31 and 32. Other active faults within Contra Costa County include the Hayward, Calaveras, and Greenville faults, all located more than 12 miles away from the PROJECT site. The actual fault trace does not lie within any of the WMUs, but the proximity to the fault trace can result in berm collapse in an event of an earthquake or other seismic related condition such as ground shaking, or ground failure. The PROJECT would not include habitable structures; however, indirect impacts could put workers at risk. Given the highly seismic environment, the WMU closure would be designed to withstand the Maximum Credible Earthquake.

A detailed engineered design, certified by a registered civil engineer or a certified engineering geologist pursuant to 27 CCR §21780(a), would be developed prior to PROJECT implementation that would specify the appropriate excavation and ground stabilization methods, appropriate shoring techniques to maintain adequate slope stability of the berms, and adequate cap cover. Construction quality assurance would be planned and supervised by a registered civil engineer or a certified engineering geologist pursuant to 27 CCR §20324(b). A certification report would be prepared and stamped by a California Registered Professional Engineer or Certified Engineering Geologist upon closure completion, in accordance with 27 CCR §21880. The recommendations and findings identified in the site-specific geotechnical analysis would be incorporated into the PROJECT as part of Mitigation Measure GEO-1. Therefore, direct and indirect impacts related to fault rupture and ground shaking would be less than significant with implementation of Mitigation Measure GEO-1.

The PROJECT site soils are typically very compressible, highly plastic, and have very high-water contents which could make them susceptible to seismic related liquefaction or landslide. As noted above, the PROJECT design would take site-specific physical conditions and constraints into consideration. Therefore, direct and indirect impacts from seismic related liquefaction or landslide would be less than significant with incorporation of Mitigation Measure GEO-1.

Prior to initiating any work, the remediation contractor would prepare a Health and Safety Plan (HASP) to be implemented throughout the PROJECT. The HASP would identify procedures and other protections for workers to prevent against collapse of berms, excavation walls and inundation of excavations, among other potential hazards. The HASP would identify measures for minimizing hazards, worker training procedures, and emergency response procedures. All work performed on the Facility would require 40-Hour Hazardous Waste Operations and Emergency Response training and certification, as well as proper PPE.

As required by Provision 22 of WDR ORDER R2-2004-0056, in the event of an earthquake of magnitude 7 or greater within 30 miles of the Facility, a post-earthquake inspection would be performed to assess potential hazards resulting from the earthquake. The cover system would be inspected for exposed low permeability layer materials, and erosion



of soils or breaching of cover materials would be noted. The inspection would record significant damage to access roads, stormwater channels, and other ancillary structures.

With incorporation of detailed engineered design, safety features in the PROJECT design, the HASP, and Mitigation Measure GEO-1, the PROJECT would have a less than significant direct or indirect impact from hazard related to any seismic activity.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM GEO-1 Implement Geotechnical Report Design Measures. Prior to issuance of grading permits, the applicant shall incorporate all design specifications and recommendations contained within the site-specific soils report into relevant project plans and specifications. These specifications shall pertain to, but are not limited to, building foundations, backfill of excavations, soil subgrade preparations, design of below-grade walls, and grading activities.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact GEO-2 Result in substantial soil erosion or the loss of topsoil?

Impact Analysis

Construction activities would entail excavation, stockpiling of soil, and grading, all of which would increase the potential for erosion at the PROJECT site from wind and stormwater runoff. The PROJECT would disturb more than one acre of ground surface and would require coverage under the Construction Stormwater General Permit (CGP). As discussed in Section 5.10, Hydrology and Water Quality, implementation of erosion control measures is required for all construction projects that disturb more than one acre of ground surface. The CGP is administered by the SFBRWQCB on behalf of the State Water Resources Control Board (SWRCB). As part of obtaining coverage under the CGP, the Applicant would be required to prepare and implement a SWPPP that must identify BMPs for implementation during PROJECT construction that will minimize the potential for erosion and sedimentation of stormwater runoff.

The PROJECT site also lies in an area that can experience high winds and could result in the loss of topsoil. Based on the review of soil mapping and soil data accessed through the National Resource Conservation Service's Web Soil Survey website, the soils on the PROJECT site have a wind erodibility rating⁴ of 2 and 4 and could be susceptible to wind erosion (USDA 2023b). As discussed in Section 5.3, Air Quality, dust control measures would be implemented that would reduce soil erosion from wind. In addition, exterior slopes of the new perimeter berm would be armored with rip-rap or other erosion resistant material to protect the slopes from wind and/or flood erosion. Therefore, impacts from wind erosion would be less than significant.

Post WMU closure, the proposed berms and caps would be built of erosion resistant materials to protect the slopes from wind and/or flood. Maintenance activities would include keeping erosion control surfaces and surface water

⁴ A wind erodibility group consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to Group 1 are the most susceptible to wind erosion, and those assigned to Group 8 are the least susceptible.



drainage ways clear and in good condition. While the PROJECT WMU construction activities would create the potential for erosion, the impact would be reduced to a less than significant level through implementation of the SWPPP required by Mitigation Measure HYD-1.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measure HYD-1 is required.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact GEO-3 Be located on strata or soil that is unstable, or that would become unstable as a result of the Project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?

Impact Analysis

As discussed above in Impact GEO-1, the PROJECT site is located in a highly seismic environment. Soils at the PROJECT site have high carbon content and are most susceptible to subsidence. Detailed engineered design would be developed prior to PROJECT implementation that would identify any potential for unstable soils and would identify appropriate measures to ensure slope stability for berms and appropriate cap material. Because these design features would be incorporated as part of the PROJECT, the potential for ground failure at the site would be considered less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact GEO-4 Be located on expansive soil, as defined in Table 18 1 B of the Uniform Building Code, creating substantial risks to life or property?

Impact Analysis

Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. As discussed above, the PROJECT site soils may be susceptible to liquefaction. The PROJECT would be designed to address soil conditions and ensure stability. In addition, the



PROJECT would not result in habitable structures that would threaten life and property under typical conditions. Therefore, the PROJECT would have a less than significant impact from expansive soils.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact GEO-5 Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

Impact Analysis

The PROJECT would not require the use of a septic or alternative wastewater disposal system. During construction, workers would use portable restroom facilities. Waste would be pumped out by qualified contractors and disposed of in accordance with all applicable regulations and codes. Therefore, impacts associated with soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems would not occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact GEO-6 Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

Impact Analysis

The UCMP database search did not identify any paleontological resources within the PROJECT area (UCMP 2018). The Quaternary alluvium and marine deposits found throughout the PROJECT area do not contain strata known to be geologically sensitive for the presence of paleontological resources (e.g., Plio-Pleistocene age sedimentary rock or various marine sediments). The PROJECT WMUs are inactive WMUs that were created by the construction of berms made of native soil and fill to create containment cells for waste material. Therefore, the likelihood of a unique paleontological resource or unique geologic feature being discovered during ground-disturbing PROJECT activities (e.g., excavation of waste material, the installation of shear panel walls backfilled with slurry, and/or grading) is very



minimal, as the above-mentioned activities would disturb mostly landfill debris and imported soil covers and would involve little or no disturbance of native soils, even if they were to contain strata known to be geologically sensitive for the presence of paleontological resources (e.g., Plio-Pleistocene age sedimentary rock). However, such a discovery could potentially lead to damage or destruction of the resource or feature, which would constitute a significant impact. If such a resource is found, the implementation of Mitigation Measure GEO-2 would reduce any potential impacts to a less than significant level.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM GEO-2 Procedures for Paleontological Resources Discovered During Construction. If any paleontological resources are encountered during ground disturbing or subsurface construction activities (e.g., trenching, grading), all construction activities within a 50-foot radius of the identified resource shall cease and the County shall immediately be notified. The applicant shall retain a qualified paleontologist (as approved by the County) to evaluate the find and recommend appropriate treatment of the inadvertently discovered paleontological resource. The appropriate treatment of an inadvertently discovered paleontological resource shall be implemented to ensure that impacts to the resource are avoided, in conformance with SVP guidelines (SVP 1996, 2010).

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.



5.8 GREENHOUSE GASES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5.8.1 Environmental Setting

Emissions Inventories and Trends

California uses the annual statewide GHG emission inventory to track progress toward meeting statewide GHG targets. The inventory for years 2000 through 2020 shows that California's GHG emissions continue to decrease, a trend observed since 2007. In 2020, emissions from routine GHG emitting activities statewide were 369.2 million metric tons of carbon dioxide equivalent (MMT_{CO₂e}), which was 35.3 MMT_{CO₂e} lower than 2019 levels. This puts total emissions just below the 2020 target of 431 million metric tons (CARB 2022b). The CARB's 2022 Scoping Plan Update was approved in December 2022 and assesses progress toward achieving the state's 2030 target and laying out a path to achieve carbon neutrality no later than 2045 (CARB 2022a).

Potential Environmental Impacts

For California, climate change in the form of warming has the potential to incur/exacerbate environmental impacts, including, but not limited to, changes to precipitation and runoff patterns, increased agricultural demand for water, inundation of low-lying coastal areas by sea-level rise, and increased incidents and severity of wildfire events (IPCC 2014). Although certain environmental effects are widely accepted to be a potential hazard to certain locations, such as rising sea level for low-lying coastal areas, it is currently infeasible to predict all environmental effects of climate change on any one location.

Emissions of GHGs contributing to global climate change are attributable in large part to human activities associated with the industrial/manufacturing, utility, transportation, residential, and agricultural sectors. Therefore, the cumulative global emissions of GHGs contributing to global climate change can be attributed to every nation, region, and city, and virtually every individual on earth. Although, a project's GHG emissions are at a micro-scale relative to global emissions but could result in a cumulatively considerable incremental contribution to a significant cumulative macro-scale impact.

Regulatory Requirements

California has adopted statewide legislation addressing various aspects of climate change and GHG emissions mitigation. Much of this legislation establishes a broad framework for the state's long-term GHG reduction and climate change adaptation program. The governor has also issued several Executive Orders (EOs) related to the state's evolving climate change policy. Of particular importance are AB 32, Senate Bill (SB) 32, and AB 1279, which outline the state's GHG reduction goals of achieving 1990 emissions levels by 2020, a 40 percent reduction below 1990 emissions levels by 2030, and carbon neutrality by 2045.



The United States has historically had a voluntary approach to reducing GHG emissions. However, on April 2, 2007, the United States Supreme Court ruled that the USEPA has the authority to regulate carbon dioxide emissions under the federal Clean Air Act. While there currently are no adopted federal regulations for the control or reduction of GHG emissions, the USEPA commenced several actions in 2009 to implement a regulatory approach to global climate change.

This includes the 2009 USEPA final rule for mandatory reporting of GHGs from large GHG emission sources in the United States. Additionally, the USEPA Administrator signed an endangerment finding action in 2009 under the Clean Air Act, finding that six GHGs (carbon dioxide, CH₄, N₂O, HFCs, PFCs, SF₆) constitute a threat to public health and welfare, and that the combined emissions from motor vehicles cause and contribute to global climate change, leading to national GHG emission standards.

The issue of combating climate change and reducing GHG emissions has been the subject of State legislation and EOs, including AB 32, AB 398, AB 1493, SB 97, SB 375, SB 1368, SB 350, SB X7-7, SB 350, SB 100, EO S-3-05, EO-B-30-15, EO-S-01-07, EO-S-13-08, and EO B-55-18. The Governor's Office of Planning and Research has adopted changes to CEQA Guidelines, which were approved in 2017. The changes to determining significance of GHG emissions are incorporated below in the two questions related to a project's GHG impact.

In 2015, the County approved its CAP, which is consistent with AB 32 with reduction targets reductions of 15 percent below 2005 GHG levels by 2020. The CAP addresses several strategies to reduce GHG emissions and implement environmental programs. The CAP includes county-wide goals and strategies, but not a project-specific threshold for determining the significance of GHG emissions.

5.8.2 Methodology

The PROJECT would result in short emissions of GHGs. Construction emissions would be generated from the exhaust of equipment, the exhaust of construction hauling trips, and worker commuter trips.

Construction emissions of GHGs were quantified by using the following methods:

- Construction equipment horsepower, load factors, and emission factors from the California Emissions Estimator Model User's Guide Appendix D (CAPCOA 2021).
- Vehicle emission factors from EMFAC2021 software.
- Potential landfill gas generation was estimated using the Intergovernmental Panel on Climate Change Guidelines for National Greenhouse Gas Inventories model.

For the PROJECT, site-specific grading calculations, equipment vehicle use, and construction schedule were developed in consultation with the PROJECT engineer. Information utilized in the emission modeling is provided in Appendix B. In April 2022, the BAAQMD adopted new land use development thresholds for project operation. These thresholds require new development projects to meet specific design elements aimed at reducing building and mobile-source GHG emissions to be considered less than significant. None of these design elements are applicable to the PROJECT, therefore, to demonstrate PROJECT significance emissions were compared to an adjusted bright-line threshold for 2030 based on the BAAQMD's 2020 bright-line threshold from the 2017 CEQA Guidelines. Consistent with SB 32, which requires a 40 percent reduction in GHG emissions compared to 1990 levels, the 2020 bright-line threshold of 1,100 MT CO₂e/year was reduced to by 40 percent. As a result, PROJECT emissions were compared to the adjusted 2030 bright-line threshold of 660 MT CO₂e/year to determine PROJECT significance.



5.8.3 Environmental Impact Analysis

This section discusses potential impacts concerning GHGs associated with the PROJECT and provides mitigation measures where necessary.

Impact GHG-1 Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Impact Analysis

Constructions Emission Inventory

The PROJECT would emit GHG emissions during construction from the off-road equipment, worker vehicles, and any hauling that may occur. As previously indicated, BAAQMD does not presently provide a construction-related GHG generation threshold but recommends that construction-generated GHGs be quantified and disclosed. The PROJECT would be constructed over an 8-year period. MT CO_{2e} emissions for each year of construction for the PROJECT are shown in Table 5.8-1. Although BAAQMD does not have a GHG threshold for construction, other Air Districts in California (e.g., South Coast Air Quality Management District, Sacramento Metropolitan Air Quality Management District) recommend that the construction emissions be amortized over the life of the PROJECT and included with the estimated operational emissions to determine a PROJECT's significance. Consistent with other air district recommendations, construction emissions were amortized over a 30-year period and disclosed in Table 5.8-1 (SCAQMD 2008).

Table 5.8-1. Construction Greenhouse Gas Emissions

Construction Year	MT CO _{2e}
Year 1 – Construct WMU 14 Consolidation Cell	1,667
Year 2 – Excavate WMU 10/11 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 10/11 wetland/habitat	2,097
Year 3 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat	2,301
Year 4 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat	2,301
Year 5 – Excavate WMU 31 waste material, transport to WMU 14 Consolidation Cell, and restore WMU 31 wetland/habitat	2,301
Year 6 – Construct WMU 14 Consolidation Cell cover	971
Year 7 – Construct WMU 32	1,898
Year 8 – Construct WMU 32	2,075
Total Construction GHG Emissions	15,610
Amortized Construction GHG Emissions (over 30-year life of the PROJECT)	520

Source: Stantec Consulting Services 2023 (Appendix B).



Operational Emission Inventory

Maintenance of the PROJECT site would be performed by existing personnel, thus there is no anticipated increase in operational emissions associated with ongoing maintenance. The PROJECT does include an LFG system to handle potential gas that could be generated due to the decomposition of consolidated waste beneath the WMU 14 cap. Gas generated beneath the impermeable cap will be passively vented through the gravel geotextile layer. The potential gas generation rate was estimated using the IPCC Guidelines for National Greenhouse Gas Inventories model (IPCC 2006). The maximum LFG generation rate was estimated to be approximately 26.7 scfm and the non-methane organic compounds generation rate was estimated to be approximately 5.3 lbs/day with approximately 2.1 lbs/day attributed to VOCs. As shown in Table 5.8-2, the PROJECT’s estimated emissions are 535 MT CO_{2e}. In April 2022, the BAAQMD released new land use development GHG thresholds to determine PROJECT significance. Since the PROJECT is not a land use development, these thresholds are not applicable to the PROJECT, Therefore, the BAAQMD’s adjusted 2030 GHG screening threshold of 660 MT CO_{2e} was used to determine PROJECT significance. Projects emitting less than 660 MT CO_{2e} are presumed to generate a less than cumulatively considerable GHG emissions.

Table 5.8-2. Operational Greenhouse Gas Emissions

Source	MT CO _{2e}
Landfill Gas Generation	15
Amortized Construction GHG Emissions (over 30-year life of the PROJET)	520
Total Greenhouse Gas Emissions	535
BAAQMD 2030 Adjusted Greenhouse Gas Screening Threshold	660
Does the PROJECT exceed the screening threshold?	No
Significant Impact?	No

Source: Stantec Consulting Services 2023 (Appendix B).

The LFG system is also considered a stationary source and would comply with all stationary source regulatory requirements and BMPs. Therefore, the PROJECT would have a less than significant impact on GHGs.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



Impact GHG-2 Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

Impact Analysis

Contra Costa County's CAP provides several reduction strategies to reach the adopted GHG emission targets by 2020. The majority of the reduction strategies presented in the CAP are only applicable to the operational phase of a project and therefore are not relevant to the PROJECT. However, the CAP does include goals to reduce transportation emissions from both on-road and off-road vehicles, specifically, by operating cleaner, more efficient vehicles and equipment. As shown in the PROJECT design and Appendix B, Tier 4 engine standards are required for many off-road construction equipment and large heavy-duty diesel trucks used for the material hauling and on-site watering would be 2015 or newer. As such, the PROJECT is consistent with the applicable CAP measure for cleaner, more efficient vehicles and equipment. The PROJECT would not conflict with the County's CAP and regulations adopted by the State of California to reduce GHG emissions; therefore, impacts would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.9 HAZARDS AND HAZARDOUS MATERIALS

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Emit hazardous emissions or handle hazardous or acutely-hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the Project area?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
6) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.9.1 Environmental Setting

The PROJECT site consists of Facility-owned property. The Facility has been historically used for the operation of an industrial oil refinery including the transport, storage, and production of oil. These types of activities are associated with potential environmental contamination from oil refinery products on the Facility.

A review of online databases conducted on November 15, 2023, identified the Facility listed on the California Department of Toxic Substance Control (DTSC) EnviroStor database (EnviroStor) as a hazardous waste facility and multiple times on the SWRCB GeoTracker database (GeoTracker) as an active cleanup program site under the oversight of the SFBRWQCB (SWRCB 2023, DTSC 2023). Closure of the PROJECT WMUs is part of the remediation activities identified for the site. In addition, according to GeoTracker, there are current and former contamination remediation sites within the PROJECT vicinity. Approximately 300 feet south of WMU 32 along Waterfront Road was a leaking underground storage tank case attributed to Landsea Terminals Inc. that was closed



in 2009. There are currently four ongoing SFBRWQCB cleanup program sites, including the PROJECT WMUs, occurring within the Facility. The other three cleanup sites are located further south of the PROJECT site and would not impact the PROJECT. Potential contaminants on the PROJECT site include petroleum, arsenic, benzene, and heavy metals (SWRCB 2023). Another SFBRWQCB clean-up site lies approximately 0.70 miles south of WMU 14 and due to distance would not impact the PROJECT (SWRCB 2023).

Railroad

Union Pacific operates an active railroad line that carries hazardous material along the existing right-of-way adjacent to Waterfront Road and the WMUs. A section of the railroad line and associated spur are located within the Facility and cross Solano Way where vehicles would access the Facility-owned portion of the PROJECT site.

Pipelines

There are several natural gas and hazardous liquid pipelines, including the Shell San Pablo Pipeline and the Kinder Morgan SFPP North Pipeline, that travel parallel to Solano Way and Waterfront Road within the PROJECT area. While no pipelines go through the PROJECT WMUs, pipelines are located west of the WMU 31 perimeter and in piperacks over the top of WMU 32.

Airports

The closest airport to the PROJECT site is the Buchanan Field Airport, located approximately 2.5 miles south of the PROJECT site. A portion of the PROJECT site is located within the airport's Influence Area, but it is not located in one of the airport's Safety Zones that dictate structure design standards. However, the eastern edge of the PROJECT site is within critical Terminal Instrument Procedures airspace, and a Federal Aviation Administration aeronautical study is required for projects with structures greater than 100 feet tall (Contra Costa County 2000). The closest private airport is the Q Area Heliport, located approximately 3 miles east of the PROJECT site.

5.9.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Safety Element of the County General Plan, Contra Costa County Airport Land Use Compatibility Plan, and Section 2.0, Project Description, of this ISMND.

5.9.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact HAZ-1	Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?
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Impact Analysis

During construction, the PROJECT would require transportation of contaminated soil and waste material from WMUs 10, 11, and 31 to WMU 14 for capping and the capping of contaminated soils at WMU 32. The PROJECT would not generate hazardous waste during operation and maintenance activities. Additionally, construction and operation of the PROJECT would not generate any new hazardous waste that is not already on the site. Temporary construction activities would also involve the transport and use of limited quantities of miscellaneous hazardous substances



including gasoline, diesel fuel, hydraulic fluid, solvents, and oils. The handling of these hazardous materials would be in accordance with all applicable federal, state, and local regulations. Additionally, these chemicals and contaminated soil would be accounted for in the Facility's hazardous material and safety plans. Materials stockpiled either in the staging areas or at WMU 14 would be covered to prevent erosion and the potential for subsequent transport into local waterways. Stockpiles of excavated material would be placed with erosion and stormwater control measures around the stockpiles. Inactive stockpiles would be covered with weighted plastic liners to reduce dust and erosion. Therefore, the PROJECT's potential for impacts related to hazardous materials transport, use, or disposal would be considered less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact HAZ-2	Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?
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Impact Analysis

As discussed above in Impact HAZ-1, the use and handling of chemicals and contaminated soil would occur during construction closure activities. As described, such activities would occur in accordance with all applicable federal, state, and local regulations. The PROJECT SWPPP, as required under MM HYD-1, would include BMPs to prevent contaminated runoff entering nearby surface waters. Additionally, workers would be expected to wear proper PPE at all times. The PROJECT would adhere to standard practices for monitoring of environmental thresholds as established by the PROJECT health and safety plan. On-site monitoring would detect environmental constituents at or below regulatory thresholds. Post construction, the caps would be regularly inspected, maintained, and repaired/upgraded in accordance with SFBRWQCB-approved CPCMP. The PROJECT would be implemented in accordance with applicable regulations and prepared plans and have a less than significant impact with mitigation.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measure HYD-1 is required.

Level of Significance After Mitigation

Less Than Significant Impact with Mitigation.



Impact HAZ-3 Emit hazardous emissions or handle hazardous or acutely-hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

Impact Analysis

None of the PROJECT components are located within 0.25 mile of an existing or proposed school. The Las Juntas Elementary School and Sun Terrace Elementary School are the nearest schools. The schools are located approximately 2 miles southwest of the PROJECT site in the City of Martinez and south of the PROJECT site in the City of Concord, respectively. Neither school is located along the PROJECT's anticipated truck route. In addition, the PROJECT would not emit hazardous emissions or handle hazardous materials that could impact these school facilities. Therefore, there would be no impact.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact HAZ-4 Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

Impact Analysis

The term "hazardous materials" includes chemicals regulated by the United States Department of Transportation, the USEPA, the DTSC, the California Governor's Office of Emergency Services, and other agencies as hazardous materials, wastes, or substances. Hazardous materials and wastes can pose a significant actual or potential hazard to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Federal and state hazardous waste definitions are similar but contain enough distinctions that separate classifications are in place for federal Resource Conservation and Recovery Act (RCRA) hazardous wastes and State non-RCRA hazardous wastes. Many federal, state, and local programs that regulate the use, storage, and transportation of hazardous materials and hazardous waste are in place to prevent these unwanted consequences. These regulatory programs are designed to reduce the danger that hazardous substances may pose to people and businesses under normal daily circumstances and as a result of emergencies and disasters.

The USEPA is the primary federal agency that regulates hazardous materials and waste. California falls under the jurisdiction of USEPA Region 9. Under the authority of RCRA and in cooperation with State and tribal partners, the USEPA Region 9 Waste Management and Superfund Divisions manage programs for site environmental assessment and cleanup, hazardous and solid waste management, and underground storage tanks.

One of the primary state agencies that regulate hazardous materials is the CalEPA. CalEPA is authorized by the USEPA to enforce and implement certain federal hazardous materials laws and regulations. The DTSC, a department of the CalEPA, protects California and Californians from exposure to hazardous waste, primarily under the authority



of the RCRA and the California Health and Safety Code (Hazardous Substance Account, Chapter 6.5 [Section 25100 et seq.] and the Hazardous Waste Control Law, Chapter 6.8 [Section 25300 et seq.] of the Health and Safety Code). The DTSC programs include dealing with aftermath clean-ups of improper hazardous waste management, evaluation of samples taken from sites, enforcement of regulations regarding use, storage, and disposal of hazardous materials, and encouragement of pollution prevention.

California Government Code Section 65962.5 requires the CalEPA to compile, maintain, and update specified lists of hazardous material release sites. CEQA (California PRC Section 21092.6) requires the lead agency to consult the lists compiled pursuant to Government Code Section 65962.5 to determine whether a project and any alternatives are identified on the Cortese list. Information resources contained on internet websites hosted by the boards or departments referenced in the statute, include DTSC's online EnviroStor database and the SWRCB's online GeoTracker database. These two databases include hazardous material release sites, along with other categories of sites or facilities specific to each agency's jurisdiction.

A review of the two online databases on September 8, 2021, identifies the Facility (the facility as a whole) listed on EnviroStor as a "hazardous waste facility" and multiple times on GeoTracker as an "active cleanup program site" under the oversight of the SFBRWQCB (SWRCB 2023, DTSC 2023). As such, the PROJECT's closure of inactive WMUs located at the Facility satisfy the regulatory requirements of the SFBRWQCB (Waste Discharge Requirements Order No. 2004-0056) and the 3008(h) Order. The PROJECT also includes post-closure monitoring and long-term maintenance of the closed WMUs.

The PROJECT is part of an ongoing cleanup site program overseen by the SFBRWQCB. Excavation and transportation of contaminated soil could result in unintended release of contaminants and expose workers and the environment. However, as discussed above in Impact HAZ-1 and HAZ-2, construction and post construction activities would be implemented in accordance with all applicable regulations and SFBRWQCB-approved CPCMP. Therefore, the PROJECT would have a less than significant impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact HAZ-5	For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?
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Impact Analysis

The PROJECT is located within the northern boundary of the Buchanan Field Airport Influence Area and the eastern boundary of the critical Terminal Instrument Procedures airspace. Land use and design restrictions are applied within these areas. However, the PROJECT site is not located within one of the airport's four Safety Zones, so design



restrictions associated with these safety zones would not be applicable. Additionally, the PROJECT would not require a Federal Aviation Administration study for Terminal Instrument Procedures airspace because the highest point within the PROJECT site would be 40 feet above msl, which is below the 100-foot height restriction. Therefore, the PROJECT would not conflict with the airport's Land Use Compatibility Plan or result in a safety hazard due to the PROJECT site's proximity to the airport and is not considered a major land use as per Countywide Policy 1.5.3 (Contra Costa County 2000). Therefore, the PROJECT would not require review by the Airport Land Use Commission. As such, the PROJECT would have no impact with regard to safety hazards for workers.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact HAZ-6 Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Impact Analysis

The PROJECT would not involve permanent modification of existing roadways. During the construction phase, access to the Facility-owned portion of the PROJECT site would be maintained in accordance with a TMP. The TMP would ensure adequate circulation and emergency access are provided to the PROJECT site during the construction phase. Therefore, PROJECT construction and operation activities would not interfere with an emergency evacuation or response plan and a less than significant impact would occur.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact HAZ-7 Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

Impact Analysis

The PROJECT site consists of PROJECT WMUs, which have been previously disturbed by industrial activities and stockpiling activities, respectively. The California Department of Forestry and Fire Protection (CAL FIRE) does not



consider the PROJECT site as wildlands or a wildland fire hazard zone (CAL FIRE 2023). In addition, the PROJECT WMUs are located on Facility-owned property served by the Facility's onsite fire brigade. The onsite fire brigade (comprising of trained Operators who work on-site at the Facility) responds to fires and is part of the 1980 Petro-Chemical Mutual Aid Organization, providing members mutual access to specially trained personnel and firefighting equipment and supplies (USEPA 2003). Therefore, the PROJECT would have no impact.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.10 HYDROLOGY AND WATER QUALITY

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that that the project may impede sustainable groundwater management of the basin?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3) 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 which would:				
i) Result in substantial erosion or siltation on- or off-site;	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
iv) Impede or redirect flood flows?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.10.1 Environmental Setting

The PROJECT is in the San Francisco Bay Area Hydrologic Region, which is approximately 4,500 square miles. The San Francisco Bay is an important commercial and ecological resource for California, and water from about 40 percent of the land in the State drains into the Bay. The Bay system includes the San Francisco Bay Estuary where water from the Sacramento River and San Joaquin River drain into the delta at the eastern end of the Suisun Bay and are conveyed to the Pacific Ocean (Contra Costa 2014).



Surface Water

The PROJECT site is located within the Mount Diablo Creek watershed, which encompasses approximately 23,846 acres across Concord, Clayton, and unincorporated County land. The PROJECT area is drained by several surface water systems, all of which empty to the Suisun Bay. The Lower Walnut Creek is approximately 200 feet west of the southern portion of WMU 32 and has estimated annual flow volume of 64.03 cubic feet per second (cfs) (USEPA 2019a). Within the Facility, the CWC runs adjacent to WMU 31 and WMU 14. Treated wastewater and stormwater from the Facility are collected in the CWC and directed to a sump and then pumped to the permitted discharge point under the Avon wharf (SFBRWQCB 2021). The CWC section immediately adjacent to the PROJECT site has an estimated volume of 0.13 cfs (USEPA 2019b). Additionally, an unnamed stream system begins adjacent to the CWC near the northeastern tip of WMU 31 and has an estimated mean annual flow volume of 0.19 cfs (USEPA 2019c). Finally, the Hastings Slough system, including Seal Creek, drains the areas east of WMUs 10/11/14 and the Point Edith Wildlife. The Hastings Slough system has a combined estimated annual flow volume of 8.21 cfs (USEPA 2019d).

Groundwater

The PROJECT site is located within the Clayton Valley and Ygnacio Valley groundwater basins. The Clayton Valley groundwater basin is approximately 17,840 acres and bounded by Suisun Bay to the north; Mount Diablo Creek to the east; the Concord Fault to the west, which acts as a border to the Ygnacio Valley groundwater basin; and the Mount Diablo foothills to the south. Aquifers in the basin can be found in Quaternary alluvium and recent alluvium deposits, with combined thickness exceeding 700 feet. There is limited data regarding groundwater movement in this basin, though the aquifers are known to be connected to the Suisun Bay. Water depth varies from 40 to 605 feet below ground level for domestic wells and 80 to 540 feet below ground level for municipal and irrigation wells (California Department of Water Resources 2004).

The Ygnacio Valley groundwater basin is approximately 15,900 acres and bounded by Suisun Bay on the north, Highway 680 and Taylor Road to the west, the Concord Fault to the east, and the City of Walnut Creek to the south. The Contra Costa Canal, and the cities of Pleasant Hill and Walnut Creek overlie the basin. Walnut and Grayson Creeks flow through the basin before draining into Pacheco Creek and then into the Suisun Bay. The Mokelumne Aqueduct also passes through the basin. The water bearing units in the basin are Quaternary Alluvium and Alluvial valley fill deposits. The combined thickness of these deposits exceeds 700 feet. There is limited data regarding the occurrence and movement of groundwater in this basin (Contra Costa County 2005). Water depth varies from 60 to 400 feet below ground level for domestic wells and 35 to 330 feet below ground level for municipal and irrigation wells (Contra Costa County 2005).

Groundwater has been encountered at various depths ranging from 0 to 31 feet below ground level further south within the Facility near 611 Solano Way (California Water Resources Control Board 2015).

Water Quality

To address water quality issues, the California Legislature established the SWRCB and the nine Regional Water Quality Control Boards in 1949. The PROJECT site is within the jurisdiction of the SFBRWQCB. The Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) is the Board's master water quality control planning document. It designates beneficial uses and water quality objectives for waters of the state, including surface waters and groundwater. It also includes programs of implementation to achieve water quality objectives. The Basin Plan has been updated to reflect the Basin Plan amendments adopted up through May 4, 2017 (SFBRWQCB 2017).



Water quality within San Francisco Bay varies seasonally within the Bay. From December through April water quality is affected by freshwater inflow from the Sacramento-San Joaquin Delta and from other local, smaller tributaries. The rest of the year, water quality is similar to that of the Pacific Ocean. Within the County, water quality of creeks that drain into the delta have been negatively impacted by runoff carrying high levels of suspended solids and pollutants associated with vehicles, such as oil, grease, and other hydrocarbons (Contra Costa 2014). Suisun Bay is the closest waterbody to the PROJECT area that is considered impaired. Section 303(d) listed pollutants for Suisun Bay include, dioxin and furan compounds, dichlorodiphenyltrichloroethane, chlordane, dieldrin, polychlorinated biphenyls, selenium, mercury, and invasive species (SWRCB 2022). The Facility currently discharges treated wastewater and stormwater to the Suisun Bay as part of its current NPDES permit.

Flooding

In general, flood hazard areas within Contra Costa County are primarily located along low-lying shoreline areas and in the eastern portion of the County near the San Joaquin River (Contra Costa 2014). The PROJECT is located south of Suisun Bay and within a 100-year flood zone (Federal Emergency Management Agency 2015). However, embankments have been constructed at the Facility to control flooding at the Facility.

Tsunamis

Tsunamis are tidal waves created by undersea fault movement. These waves are fast moving and create large swells of water and upon reaching the coast can sweep inland with a large amount of force. There have been 19 tsunamis recorded in the San Francisco Bay between 1868 and 1968. However, wave height diminishes moving east in the Bay; a tsunami traveling between the Golden Gate Bridge and City of Richmond would have its wave height halved and is expected to be minimal upon reaching the head of the Carquinez Strait. The PROJECT site is located further east of the Carquinez Strait and the likelihood of a damaging tsunami in the PROJECT area is low due to expected wave attenuation (Contra Costa 2014).

Seiches

Seiches are standing waves oscillating in a body of water, typically caused by strong winds, rapid changes in atmospheric pressure, or seismic ground shaking. Elongated and deep bodies of water are most susceptible to this occurrence. Seiches may cause overtopping of impoundments such as dams and temporarily flood shorelines. There have been no recorded instances of seiche events in the Bay Area (Contra Costa 2014).

5.10.2 Methodology

The evaluation of potential hydrologic and water quality impacts was based on a review of the Contra Costa County General Plan, and other regulatory documents from the SFBRWQCB, Department of Water Resources, USEPA, and Federal Emergency Management Agency. The information obtained from these sources are summarized to establish existing conditions and to identify potential environmental effects.

5.10.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact HYD-1 Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or groundwater quality?

Impact Analysis

Excavation and other soil-disturbing activities associated with the PROJECT could potentially affect water quality as a result of soil or sediment erosion. In addition, leaks from construction equipment; accidental spills of fuel, oil, or hazardous liquids used for equipment maintenance; and accidental spills of construction materials are all potential sources of pollutants that could degrade water quality during remediation activities. Wastewater is not anticipated to be generated during PROJECT construction. However, in the event that wastewater is generated from groundwater dewatering to facilitate excavation, stormwater, dust, odor suppression liquid runoff from exposed WMU soil and waste, or there is excess water from soil/waste strengthening and compaction activities, the wastewater will be managed within the construction footprint in accordance with the Wastewater Handling Plan prepared as part of the Construction Work Plan.

Stormwater from impervious surfaces constructed for the PROJECT to be discharged to jurisdictional waters will be pre-treated. Upon completion of remediation activities at the PROJECT WMUs, the WMUs would be regularly inspected, maintained, and repaired/upgraded in accordance with SFBRWQCB-approved Title 27 Closure Plans.

Therefore, wastewater and stormwater would not adversely affect water quality or violate water quality standards. However, as discussed above, the land disturbing activities associated with the PROJECT could have erosion and sedimentation effects on surface water quality that could result in a potentially significant impact. Implementation of Mitigation Measure HYD-1 would ensure that construction impacts on surface water quality remain less than significant.

To mitigate the impacts to jurisdictional waters, the Applicant has purchased 8.47 wetlands credits at Wildlands' North Suisun Mitigation Bank, has purchased a 19-acre property that is adjacent to Contra Costa County's Lower Walnut Creek Restoration Site and would create approximately 18.58 acres of seasonal wetlands on the closed WMUs 10, 11, and 31. On the 19-acre property, the Applicant removed existing infrastructure and debris from the site and graded 8.60 acres to an elevation that allows for the future hydrologic connection with the Lower Walnut Creek Restoration site. The parcel was then transferred to the John Muir Land Trust and the property has been incorporated into the Lower Walnut Creek Restoration Project and wetlands have been created on the parcel. The grading of the parcel and the creation of the wetlands was evaluated in the County ISMND.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

MM HYD-1: **Prepare and Implement a SWPPP.** The construction contractor shall obtain NPDES permit coverage as required by the CGP (SWRCB Order WQ 2022-0057-DWQ). In accordance with the CGP requirements, the construction contractor shall electronically file the Permit Registration Documents, which include a Notice of Intent, a Risk Level determination, site drawings and maps, signed certification, SWPPP, applicable plans, calculations, and other supporting documentation for compliance with existing permitted Phase I or Phase II municipal separate storm sewer system post-construction requirements or the post-construction standards of the CGP, and other site-specific Permit Registration Documents that may be required. The SWPPP shall be prepared by a



Qualified SWPPP Developer who has attended a training course sponsored or approved by the Water Board.

At a minimum the SWPPP shall identify BMPs for implementation during PROJECT construction that may include routing stormwater away from exposed materials and excavation areas, hay bales, water bars, covers, sediment fences, sediment ponds, geotextile blankets, fiber rolls, temporary slope drains, mulching of exposed areas vehicle mats in wet areas, and other erosion-reducing features. The remediation contractor shall implement the BMPs identified in the SWPPP throughout the remediation work to help stabilize graded areas and reduce erosion and sedimentation. Structural construction BMPs shall be installed prior to initiation of ground disturbance.

Level of Significance After Mitigation

Less Than Significant With Mitigation.

Impact HYD-2 Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Impact Analysis

Groundwater at the PROJECT site is relatively shallow with depths to groundwater at the site ranging from 1 feet bgs to 3 feet bgs (ART 2017). Based on historical elevations, some of the waste materials in WMUs 10/11/14, 31, and 32 are submerged in groundwater.

As previously noted, it would be necessary to dewater excavations of intruding groundwater. The potential impacts on water quality from dewatering are addressed in Impact HYD-1, above. Groundwater does not comprise part of the domestic water supply for the PROJECT site and surrounding areas. Water is supplied to the area by the Contra Costa Water District, whose primary source of water is surface water from the Central Valley Project via the Sacramento-San Joaquin Delta. Once construction activities are completed, the PROJECT would not consume any water including groundwater. The construction-phase dewatering from excavations is not expected to substantially lower the level of the regional groundwater table. The PROJECT would include new impervious surfaces, including the WMU 32 cap, WMU 14 cap, and new access roadways. However, increases in impervious surface would be minor and would not impact overall recharge potential. Therefore, for the foregoing reasons, the PROJECT would have a less than significant impact on groundwater supplies.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



Impact HYD-3 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 which would:

Impact Analysis

i. Result in substantial erosion or siltation on- or off-site;

As discussed in Impact HYD-1, above, the PROJECT would include temporary excavations and grading that would substantially alter the existing drainage pattern in the immediate vicinity of the PROJECT site, and measures would be required to ensure that the PROJECT does not create substantial erosion or siltation of downstream receiving waters during construction activities. The changes to drainage patterns would be temporary and would be confined to a limited area. Following completion of the PROJECT, the excavated areas in WMUs 10, 11, and 31 would be backfilled with clean soil and their existing perimeter berms would be reconstructed to the approximate current pre-excavation grades. These WMUs would be revegetated to restore the impacted wetlands and wildlife habitat in accordance with the HMMP.

WMUs 14 and 32 would be covered consistent with the requirements of Title 27. Drainage channeling and/or berms would be constructed as necessary to transfer surface water away from the WMUs. The final cover would be constructed to maintain drainage off the WMU into the drainage channels and downstream controls.

Therefore, the PROJECT would have a less-than-significant permanent impact from erosion and siltation and implementation of Mitigation Measure HYD-1 would ensure that the potentially significant temporary impact during remediation activities would be reduced to a less than significant level.

ii. Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite;

While the PROJECT would temporarily alter the existing drainage pattern on the site during remediation and restoration activities, as discussed in Impacts HYD-1 and HYD-2, above, the permanent effects would be minimal, and would not have the potential to result in flooding, either on- or off-site. WMUs 10, 11, and 31 would be revegetated to restore the impacted wetlands and would reduce the threat of flooding by detaining surface flows onsite and distributing them in the new wetlands. WMUs 14 and 32 would include drainage channeling and/or berms. Maintenance and repair activities would include keeping erosion control surfaces and surface water drainage ways clear and in good condition. Consequently, the PROJECT would not alter drainage patterns that could result in flooding. Impacts would be less than significant.

iii. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

The PROJECT would not contribute runoff water to existing stormwater drainage systems. WMUs 14 and 32 would be constructed with stormwater drainage channels that would direct stormwater into lined channels, culverts, or restored area in WMUs 10 and 11 in accordance with the CPCMP. The channels and culvert would be sized to handle the 100-year, 24-hour storm event. 401 certification would require details for stormwater discharges from WMU 14 to restored wetlands in WMUs 10 and 11. Those details will be defined in the future WMU 10/11/14 Title 27 Closure Plan and sent in duplicate to the SFBRWQCB for the 401 certification text as necessary. However, as discussed under Impact HYD-1, construction, operation, and



maintenance activities associated with the PROJECT could result in substantial additional sources of polluted runoff if pollutants (e.g., sediment, partially treated or untreated contaminated groundwater, materials stored and handled on-site) are released and if pollutants have the potential to become exposed to stormwater runoff. Implementation of appropriate BMPs defined in Mitigation Measure HYD-1 would minimize impacts on water quality by controlling potential pollutants, including sediment, and runoff discharges from the PROJECT area.

As previously discussed, specific details will be included in the individual Title 27 Closure Plan. Stormwater treatment will be provided in accordance with Provisions C.3.c and C.3.d of the Municipal Regional Stormwater NPDES Permit (NPDES Permit No. CAS612008) unless the Provision C.3.e alternative compliance options are invoked. Consequently, any impacts associated with pollutants resulting from alterations of drainage and water quality during construction, operation, and maintenance would be mitigated to a less than significant level.

iv. Impede or redirect flood flows?

While the PROJECT would temporarily alter the existing drainage pattern on the site during remediation and restoration activities, as discussed in Impacts HYD-1 and HYD-2, above, the permanent effects would be minimal, and would not have the potential to impede or redirect flood flows. WMUs 10, 11, and 31 would be revegetated to restore the impacted wetlands and WMUs 14 and 32 would include drainage channels. Consequently, the PROJECT would not impede or redirect flood flows. Impacts would be less than significant.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measure HYD-1 is required.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.

Impact HYD-4 In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

Impact Analysis

The PROJECT site is not within a tsunami hazard area or in an area subject to seiche. Although the PROJECT is within a 100-year flood hazard zone, embankments have been constructed around the on-Facility PROJECT components to control risk of on-site flooding. Therefore, the PROJECT would not risk release of pollutants due to PROJECT inundation. Therefore, the PROJECT would have a less than significant impact on the risk of release of pollutants from project inundation.

Level of Significance Before Mitigation

No Impact.



Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact HYD-5 Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Impact Analysis

The PROJECT site is within the Clayton Valley and Ygnacio Valley groundwater basins. Both groundwater basins are classified as “very low” priority zones and therefore a sustainable groundwater management plan has not been adopted for either of these groundwater basins (California Department of Water Resources 2021). The PROJECT would be required to comply with the policies and objectives of the Water Quality Control Plan for the San Francisco Bay Basin. As discussed in Impact HYD-1, the PROJECT would be required to implement Mitigation Measure HYD-1 and obtain coverage under the CGP and prepare a SWPPP. The SWPPP would be implemented during construction and incorporate BMPs to reduce potential impacts to water quality.

The WMU Closure PROJECT will ensure compliance with water quality standards during and post construction through measures incorporated into plans that will be subject to review and approval of the SFBRWQCB. These include the HMMP and individual Title 27 Closure Plans.

Therefore, the PROJECT would not conflict with or obstruct implementation of a sustainable groundwater management plan, or with the Water Quality Control Plan for the SFBRWQCB.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measure HYD-1 is required.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.



5.11 LAND USE AND PLANNING

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Physically divide an established community?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.11.1 Environmental Setting

The PROJECT site is in unincorporated Contra Costa County, approximately 2 miles east of I-680 and the City of Martinez. Central County contains 10 cities, several unincorporated communities, and primarily residential and commercial uses (Contra Costa County 2005). The PROJECT WMUs and staging areas are located within Assessor Parcel Numbers 159-280-010, 159-280-011, 159-270-006, 159-260-013, 159-260-014, and 159-310-034 (Contra Costa County 2023a).

Land Use and Zoning

The County General Plan designation and zoning district are provided in Table 5.11-1 for each PROJECT component.

Table 5.11-1. General Plan Designation and Zoning District

PROJECT Component	General Plan Designation	Zoning
WMU 10/11/14	Heavy Industrial	Heavy Industrial
WMU 31	Open Space	Heavy Industrial
WMU 32	Heavy Industrial	Heavy Industrial

Source: Contra Costa County 2021.

Land Use

The Heavy Industrial designation allows for activities requiring large areas of land with convenient truck, ship, and/or rail access (Contra Costa County 2023b). These activities are not compatible with residential land uses. The Open Space designation is intended for public lands containing wetlands and tidelands, significant ecological resources, or geologic hazards, and privately-owned lands where public or private agencies hold future development rights.

Zoning

All PROJECT components are located within the Heavy Industrial zoning district. Uses permitted in this zoning district include, but are not limited to, the manufacturing or processing of petroleum, lumber, steel, chemicals, explosives, fertilizers, gas, rubber, paper, cement, sugar, and all other industrial or manufacturing products (Contra Costa County 2023b).



5.11.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the County General Plan, Zoning Ordinance, and Section 2.0, Project Description, of this ISMND.

5.11.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact LU-1 **Physically divide an established community?**

Impact Analysis

The PROJECT involves the closure of PROJECT WMUs, mitigation and maintenance of the PROJECT WMUs. The PROJECT site is in an area developed with industrial infrastructure that is surrounded by open space, marshlands, and waterways. There are no established communities within the Facility-owned property, non-Facility-owned property, or surrounding area that would be divided as a result of the PROJECT. The closest established community is the unincorporated community of Vine Hill, located approximately 1.5 miles southwest of WMU 32; and the community of Clyde, located approximately 1.5 miles southeast of WMU 11/10/14. Therefore, no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact LU-2 **Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?**

Impact Analysis

The PROJECT site is in an industrial area of Contra Costa County that has been previously developed with the necessary infrastructure to support operation of the Facility. The WMUs are located on land that has been previously disturbed by the historic industrial activities associated with operation of the Facility. There would be no changes to existing land use designations or zoning within the PROJECT site or surrounding area. The proposed remediation and restoration activities would be consistent with the current zoning designations and comply with all applicable General Plan goals and policies. Specifically, the PROJECT would comply with General Plan Policy 7-116 regarding the clean-up of contamination. The PROJECT would also comply with the 65/35 Land Preservation Standard because the PROJECT components are located on land previously disturbed by the industrial and sand and gravel staging activities, so there would be no increase in the amount of urban land within the County. As such, the PROJECT would not conflict with any applicable land use plan, policy, or regulation. No impact would occur.



Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.12 MINERAL RESOURCES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist that would be of value to the region and the residents of the State?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.12.1 Environmental Setting

The DOC, Division of Mine Reclamation, compiles data on the current status of mines and the commodities produced. In addition, the California Geological Survey produces Mineral Land Classification studies and maps that identify areas with potentially important mineral resources that should be considered in local and regional planning. Significant mineral resource areas within Contra Costa County, which the County General Plan intends to protect, includes areas containing clay, diabase, and domengine sandstone (Contra Costa County 2010).

The PROJECT site is in north Contra Costa County in an area that is primarily developed with industrial infrastructure and surrounded by open space, marshlands, and waterways. The PROJECT site consists of the PROJECT WMUs which are used for mining purposes. Based on the Mineral Land Classification Map for Contra Costa County, the PROJECT WMUs are within an area that has not been classified by the California Geological Survey because it is within an area not subject to urbanization. The County General Plan does not identify the PROJECT site as a significant mineral resource area (Contra Costa County 2010).

5.12.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Conservation Element of the County General Plan (Contra Costa County 2010) and the DOC Mineral Land Classification Map for Contra Costa County, Port Chicago Quadrangle (Special Report 146, Plate 2.34) (DOC 2018).

5.12.3 Environmental Impact Analysis

This section discusses potential impacts to mineral resources associated with the PROJECT and provides mitigation measures where necessary.

Impact MIN-1	Result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist that would be of value to the region and the residents of the State?
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Impact Analysis

The PROJECT site is not identified by the California Geological Survey or the County General Plan as a state designated mineral resource zone (MRZ). The PROJECT site consists of the PROJECT WMUs which do not support



mineral extraction operations. As such, the PROJECT would not result in the loss of availability of a known mineral resource and no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact MIN-2 Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

Impact Analysis

The PROJECT site is not used for mining activities or designated as an important mineral resource recovery site by the County General Plan. As such, implementation of the PROJECT would not result in the loss of locally important mineral resources and no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.13 NOISE

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Generation of excessive groundborne vibration or ground-borne noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport of public use airport, would the project expose people residing or working in the project area to excessive noise levels?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5.13.1 Environmental Setting

Existing Ambient Noise Levels

The existing noise environment in a PROJECT area is characterized by the area's general level of development due to the high correlation between the level of development and ambient noise levels. Areas which are not urbanized are relatively quiet, while areas which are more urbanized are noisier as a result of roadway traffic, industrial activities, and other human activities.

Contra Costa County as a whole is exposed to several sources of noise, including traffic on major highways, such as I- 680 and California Highway 4, noise from railways, and industrial uses. Traffic noise depends primarily on traffic speed (tire noise increases with speed), proportion of medium and large truck traffic (trucks generate engine, exhaust, and wind noise in addition to tire noise), and number of speed control devices, such as traffic lights (accelerating and decelerating vehicles and trucks can generate more noise).

The loudest source of ambient noise at the PROJECT site is anticipated to be existing operational activity from the Facility itself and traffic along Waterfront Road. According to Figure 11-5C "Noise Contours" in the Contra Costa County General Plan, noise levels along the edge of the PROJECT site along Waterfront Road would be within the 60-65 decibels (A-weighted) [dB(A)] day-night noise level contour. The same figure also shows the existing ambient noise levels at the closest residential receiver to the PROJECT site are within the 60-65 dB(A) day-night noise level contour to I-680.

Sensitive Receptors

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are considered to be more sensitive to noise intrusion than are commercial or industrial activities. Ambient noise levels can also affect the perceived desirability or livability of a development.



The PROJECT WMUs are located in the northern portion of the Facility and are generally surrounded by Facility industrial infrastructure to the west; Facility industrial infrastructure to the south, the Carquinez Strait and Suisun Bay to the north, and the Point Edith Wildlife Area to the east.

The nearest potential receptor is the unincorporated community of Vine Hill, located approximately 1.5 miles southwest of WMU 32; and the community of Clyde, located approximately 1.75 miles southeast of WMU 11/10/14.

Vibration

Operation of heavy construction equipment, particularly pile driving and other impact devices such as pavement breakers, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance.

Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (PPV). Table 5.13-1 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006).

Table 5.13-1. Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity at 25 Feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic/vibratory)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003

Source: Federal Transit Administration 2006b.

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2006). PPVref is the reference PPV from Table 5.13-1.

$$PPV = PPV_{ref} \times (25/Distance)^{1.5}$$

Table 5.13-2 summarizes guidelines vibration annoyance potential criteria suggested by Caltrans (Caltrans 2013).



Table 5.13-2. Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum peak particle velocity (in./sec)	
	Transient Sources	Continuous/Frequent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: California Department of Transportation 2013.

Table 5.13-3 summarizes guideline vibration damage potential criteria suggested by Caltrans (Caltrans 2013).

Table 5.13-3. Guideline Vibration Damage Potential Criteria

Structure and Condition	Maximum Peak Particle Velocity (in./sec)	
	Transient Sources	Continuous/Frequent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structure	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Source: California Department of Transportation 2013.

5.13.2 Methodology

Short-term site noise data were used as an input to the Federal Highway Administration Roadway Construction Noise Model as the existing ambient noise level input. The Roadway Construction Noise Model is used as the Federal Highway Administration’s national standard for predicting noise generated from construction activities. The Roadway Construction Noise Model analysis includes the calculation of noise levels (maximum sound level and equivalent average noise level [Leq]) at incremental distances for a variety of construction equipment. The spreadsheet inputs include acoustical use factors, maximum sound level values, and Leq values at various distances depending on the ambient noise measurement location. Noise modeling outputs are included in Appendix F.

5.13.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact NOI-1	Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
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Impact Analysis

Two types of short-term noise impacts could occur during construction of the PROJECT. First, construction crew commutes and the transport of construction equipment and materials to the PROJECT site would incrementally increase traffic on roads leading to the PROJECT site. This increased traffic would be composed of vehicles, medium trucks, and heavy trucks. All construction traffic required to leave the Facility would travel through the Facility and immediately access I-680 or CA Highway 4. No construction vehicle traffic will travel through any residential or commercial areas to access the highways. The PROJECT would not expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Therefore, the PROJECT would not cause increased traffic noise levels at any sensitive receivers, and this would be a less than significant impact relative to this topic.

The second type of short-term noise impact is related to noise generated during construction. Each construction stage has its own mix of equipment and, consequently, its own noise characteristics. These various construction operations would change the character of the noise generated at the PROJECT site and, therefore, the noise level as construction progresses.

Table 5.13-4 below lists types of construction equipment that may be used during construction and the maximum and average operational noise level as measured at 1.5 miles from the operating equipment, at the nearest potential receptor.

Table 5.13-4. Summary of Federal Highway Administration Roadway Construction Noise Model at Existing Apartment Receiver

Source	Distance to Nearest Sensitive Receptor	Sound Level at Apartments		
		Lmax, dB(A)	Acoustical Use Factor (%)	Leq, dB(A)
Backhoe	1.5 mile	36.7	40	32.7
Compactor (ground)	1.5 mile	42.3	20	35.3
Concrete Mixer Truck	1.5 mile	37.9	40	33.9
Bulldozer	1.5 mile	40.8	40	36.8
Drill Rig	1.5 mile	38.2	20	31.3
Dump Truck	1.5 mile	35.6	40	31.6
Excavator	1.5 mile	39.8	40	35.8
Forklift	1.5 mile	42.5	40	38.5
Front End Loader	1.5 mile	38.2	40	34.2
Flat Bed Truck	1.5 mile	33.4	40	29.4
Generator	1.5 mile	39.7	50	36.7
Pickup Truck	1.5 mile	34.1	40	30.1
Pneumatic Tools	1.5 mile	44.3	50	41.3



Source	Distance to Nearest Sensitive Receptor	Sound Level at Apartments		
		Lmax, dB(A)	Acoustical Use Factor (%)	Leq, dB(A)
Welder / Torch	1.5 mile	33.1	40	29.1
Tractor	1.5 mile	43.1	40	39.1

Source: Federal Highway Administration Roadway Construction Noise Model 2008, AQ/GHG assumptions (Appendix B)
Notes: dB(A) – decibels (A-weighted); Leq – equivalent average noise level; Lmax – maximum sound level

The calculated Leq level for all construction equipment at the closest residential receiver is expected to be 41 dB(A) or lower. According to the noise contours in the Contra Costa General Plan, a noise level of 41 dB(A) will be significantly lower than what is currently experienced at the closest noise-sensitive receivers. Also, the calculated Leq level for all construction equipment is below the “Normally Acceptable” listed in Figure 11-6 in the Contra Costa General Plan. Therefore, construction noise from the PROJECT would not cause a substantial temporary or periodic increase in ambient noise levels in the PROJECT vicinity above levels existing without the PROJECT and the impact would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact NOI-2 Generation of excessive ground-borne vibration or ground-borne noise levels?

Impact Analysis

The nearest potential noise receptor is the unincorporated community of Vine Hill, located approximately 1.5 miles southwest of WMU 32; and the community of Clyde, located approximately 1.75 miles southeast of WMU 11/10/14. Construction equipment that could be used during the PROJECT construction would generate vibration levels between 0.003 PPV and 0.089 PPV at 25 feet, as shown below in Table 5.13-5.

Table 5.13-5. Vibration Source Levels for Construction Equipment

Type of Equipment	Peak Particle Velocity at 25 Feet	Peak Particle Velocity at 50 Feet	Peak Particle Velocity at 1.5 Miles	Threshold at which Human Annoyance Could Occur	Potential for PROJECT to Exceed Threshold
Large Bulldozer	0.089	0.031	0.00003	0.10	None
Loaded Trucks	0.076	0.027	0.00002	0.10	None
Small Bulldozer	0.003	0.001	0.0000009	0.10	None
Auger/Drill Rigs	0.089	0.031	0.00003	0.10	None
Jackhammer	0.035	0.012	0.00001	0.10	None



Type of Equipment	Peak Particle Velocity at 25 Feet	Peak Particle Velocity at 50 Feet	Peak Particle Velocity at 1.5 Miles	Threshold at which Human Annoyance Could Occur	Potential for PROJECT to Exceed Threshold
Vibratory Hammer	0.070	0.025	0.00002	0.10	None

Source: Federal Transit Administration 2006

All the ground-borne vibration levels are below the Federal Transit Administration vibration threshold at which human annoyance could occur of 0.10 PPV. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours as per the Contra Costa County General Plan. Therefore, construction vibrations are not predicted to cause damage to existing buildings or cause annoyance to sensitive receptors. As such, implementation of the PROJECT would have a less than significant impact related to vibration.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact NOI-3 For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Impact Analysis

The nearest public airport to the PROJECT site is the Buchanan Field Airport, located approximately 2.5 miles south of the PROJECT site. The PROJECT site falls well outside the 55 dBA Community Noise Equivalent Level contour line for the Buchanan Airport as shown in Figure 11-5V “Buchanan Airport Noise Contours” in the Contra Costa County General Plan. Therefore, this would be a less than significant impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.14 POPULATION AND HOUSING

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.14.1 Environmental Setting

The PROJECT site is located in unincorporated Contra Costa County, approximately 2 miles east of I-680 and the City of Martinez. This portion of the County is developed with industrial infrastructure that is surrounded by open space, marshlands, and waterways. The PROJECT site consists of the PROJECT WMUs which do not include residential development. The nearest residential use includes the unincorporated community of Vine Hill, located approximately 1.5 miles southwest of WMU 32; and the community Clyde, located approximately 1.75 miles southeast of WMU 11/10/14.

5.14.2 Methodology

The following analysis is based on general descriptions in the County General Plan and Section 2.0, Project Description, of this ISMND.

5.14.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact POP-1	Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?
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Impact Analysis

The PROJECT involves the closure of PROJECT WMUs and mitigation and monitoring activities. The PROJECT activities do not involve the construction of new homes, businesses, or extension of roads and infrastructure that would directly induce population growth. The PROJECT would require approximately 75 construction workers at any given time. The Facility maintains a list of qualified regional labor having the necessary training to work on the PROJECT site. Therefore, construction workers are expected to already live in the area and would not indirectly induce population growth. As such, the PROJECT would not directly or indirectly induce population growth and no impact would occur.



Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact POP-2 Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

Impact Analysis

The PROJECT site includes the PROJECT WMUs which are not developed with residential dwelling units. Therefore, the PROJECT would not displace existing people or housing that would require construction of replacement housing. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.15 PUBLIC SERVICES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:				
Fire protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Police protection?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Schools?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Parks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Other public facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.15.1 Environmental Setting

Fire Protection

The PROJECT site consists of Facility-owned property and non-Facility-owned property. The PROJECT WMUs would be served by the Facility's fire brigade, which consists of trained Operators who work at the Facility (USEPA 2003). The Facility is part of the 1980 Petro-Chemical Mutual Aid Organization, which is a mutual aid agreement between local refineries, industrial plants, and the CCCFPD and West Sacramento Fire District. The Petro-Chemical Mutual Aid Organization members provide mutual access to specially trained personnel and firefighting equipment and supplies.

Police Protection

The PROJECT site would be served by the Facility's on-site armed security force as well as the Contra Costa County Office of the Sheriff (Office of the Sheriff), which covers the unincorporated portions of the County and serves over 1,000,000 residents with over 1,100 sworn officers and employees (Office of the Sherriff 2023a). Additionally, the County office of the California Highway Patrol provides police coverage along all unincorporated county roadways (CHP 2023). The closest Sherriff's Department location is the Muir Station located at 1680 Muir Road in Martinez, approximately three miles south of the PROJECT site, and is staffed by one Lieutenant, five Sergeants, 23 Deputies, one Community Service Officer, one Crime Prevention Specialist, and three volunteers and covers unincorporated areas in Lafayette, Concord, Pleasant Hill, Martinez, Clyde, and Pacheco (Office of the Sherriff 2023b). The Office of the Sheriff has an emergency response time goal of 5 minutes for 90 percent of all calls for central business district, urban, and suburban areas. As of 2011, which is when the most recent Municipal Service Review for Law Enforcement was published, response to Priority 1 incidents (highest priority incidents) in unincorporated areas of the County is an average of 8 minutes and 39 seconds, while the average response time for all law enforcement agencies is 5 minutes and 19 seconds (Contra Costa County Local Agency Formation Commission 2011).



Schools

The PROJECT site is within the Mount Diablo Unified School District boundary which operates 31 elementary schools, 9 middle schools, 5 high schools, and 16 alternative schools and programs. The nearest school within this District is Sun Terrace Elementary School, located approximately 2 miles south of the Suisun Properties mitigation land (Mount Diablo Unified School District 2023). In addition, the PROJECT site is adjacent to the Martinez Unified School District boundary where the nearest school is Las Juntas Elementary School located approximately 2 miles southwest of the Facility property.

Parks

The East Bay Regional Parks District manages most of the regional parks throughout the County. The closest East Bay Regional Parks District park is the 198-acre Waterbird Regional Preserve, located approximately one mile southwest of the Facility property.

Other Public Services

The Contra Costa Regional Medical Center is the closest hospital to the PROJECT site, located approximately three miles to the southwest (Contra Costa Health Services 2023).

The Contra Costa County Library system provides library services at 28 locations throughout the County. The closest library branch is the Martinez Library located approximately three miles west of the PROJECT site (Contra Costa County Library 2023).

5.15.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Public Facilities / Services Element of the County General Plan (Contra Costa County 2005), Contra Costa Local Agency Formation Commission Municipal Service Reviews, and Section 2.0, Project Description, of this ISMND.

5.15.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact PUB-1	Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services: Fire protection? Police protection? Schools? Parks? Other public facilities?
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Impact Analysis

Fire Protection

PROJECT activities would not generate demand for additional fire services beyond those that are currently provided by the Facility fire brigade and CCFPD at the PROJECT site. The Facility is part of the 1980 Petro-Chemical Mutual Aid Organization and would continue to receive fire protection and response service under the Petro-Chemical Mutual Aid agreement. Implementation of the PROJECT would not result in the construction of new or altered governmental facilities buildings; however, would result in the construction of new structures (consolidation cells). Prior to construction, the Facility's fire brigade and CCCFPD would review applicable PROJECT construction plans to ensure there is adequate emergency access and that all construction work is performed in accordance with applicable Facility requirements, rules, and standing instructions. Compliance with the requirements of the Facility and the CCCFPD would reduce the risks associated with fire hazards. Therefore, there would be no need for new or expanded governmental facilities to maintain public services related to fire protection. No impact would occur.

Police Protection

The PROJECT site is located in unincorporated Contra Costa County and served by the Facility's on-site armed security force as well as the Office of the Sherriff. The PROJECT would not result in the construction of new buildings or result in a use that would increase the County's population and generate demand for additional police protection services beyond those that currently exist at the PROJECT site. Therefore, there would be no need for new or expanded police protection facilities to maintain public services related to police protection. No impact would occur.

Schools

The PROJECT site is currently located within the Mount Diablo Unified School District boundary. The PROJECT does not involve a use that would increase demand for new or expanded school facilities. Therefore, no impact would occur.

Parks

The PROJECT would not result in a use that would increase the County's population and generate a need to construct or expand additional park facilities. Temporary construction workers are expected to be hired from the existing population, so there would be no increased use of the East Bay Regional Parks District facilities. Therefore, there would be no impact.



Other Public Facilities

The PROJECT would not result in an increase in population that would lead to elevated use of Contra Costa County Library, Contra Costa Regional Medical Center, or other public facilities. Therefore, there would be no impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.16 RECREATION

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.16.1 Environmental Setting

The Contra Costa County Public Works Department is responsible for operating and maintaining County recreational facilities. There are also several regional park districts operating in the County, with East Bay Regional Park District (EBRPD) as the largest park district (Contra Costa County 2018). The EBRPD maintains over 120,000 acres of parks, including over 1,250 miles of trails in the County (EBRPD 2023).

The PROJECT site is in north Contra Costa County, approximately 2 miles east of I-680 and the City of Martinez. The PROJECT site consists of the PROJECT WMUs that were created for the disposal of waste material. The PROJECT WMUs cannot be accessed by the public and do not contain recreational facilities. The nearest park to the PROJECT site is the Waterbird Regional Preserve, approximately 1-mile to the southwest on Waterfront Road (Contra Costa County 2010). The Waterbird Regional Preserve is 198 acres and managed by the EBRPD. The Waterbird Regional Preserve can be accessed by the public for birdwatching and hiking (EBRPD 2023). In addition, the 761-acre Point Edith Wildlife Area is located immediately east of the PROJECT WMUs. The Point Edith Wildlife area is a tidal area consisting of sloughs and small ponds managed by CDFW. Public access to the Point Edith Wildlife Area is only available by boat (CDFW 2023).

5.16.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Open Space Element of the County General Plan and Section 2.0, Project Description, of this ISMND.

5.16.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact REC-1 Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

Impact Analysis

The PROJECT involves closure of the PROJECT WMUs and mitigation and monitoring activities. The PROJECT does not involve the development of residential uses that would increase the use of existing recreational facilities. Therefore, the PROJECT would not result in the deterioration of existing recreational facilities and no impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact REC-2 Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

Impact Analysis

The PROJECT involves closure of the PROJECT WMUs and mitigation and monitoring activities. The PROJECT does not include the construction or expansion of park facilities. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.17 TRANSPORTATION

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3) Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) Result in inadequate emergency access?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

5.17.1 Environmental Setting

The PROJECT site is located adjacent to Waterfront Road near its intersection with Solano Way. Construction vehicles access would be provided typically through the North Gate on Waterfront Road, South Gate on Solano Way, or East Gate on Bates Avenue. The roadways most relevant to the PROJECT are discussed below.

Regional Roadways

I-680 is an 8- to 12-lane freeway that serves as the main roadway within the County. I-680 runs north-south through Contra Costa County towards San Jose in the south and across the Benicia Bridge to Solano County in the north. Regional access to the PROJECT site from the north and south would be provided by the Marina Vista Avenue/Waterfront Drive interchange.

Highway 4 runs east-west from San Pablo Avenue in Hercules towards Stockton in the east. The segment of State Route (SR) Highway 4 south of the PROJECT site has four lanes. SR Highway 4 would provide regional access to the PROJECT site from the Solano Way offramp or the I-680 interchange.

Local Roadways

Waterfront Road is a two-lane arterial road that runs east-west adjacent to the PROJECT site and separates WMUs 31 and 32 from WMUs 10/11/14. Waterfront Road begins east of I-680 and connects to Marina Vista Avenue to the west of I-680.

Solano Way is a 2- to 6-lane collector road that provides access to the Facility from the Highway 4 offramp. North of SR Highway 4, Solano Way travels through the length of the Facility and access is limited to authorized personnel beyond the Facility's South Gate. South of SR Highway 4, Solano Way is open to the public and traverses through a residential area.



Transit Conditions

Existing transit service within Central Contra Costa County is provided by the Central Contra Costa Transit Authority, which is also known as known as the County Connection. The Industrial Way/Bates Avenue bust stop is the closest transit location to the PROJECT site, located approximately two miles southeast of the PROJECT site and less than a mile away from the Facility's East Gate. Additionally, the Arnold Industrial Way/Solano Way bus stop is located near the Facility's South Gate and is located approximately two miles south of the PROJECT site (County Connection 2019).

Bikeways

There are currently no bicycle facilities within the PROJECT area, and the closest bike route is approximately 1.6 miles east of the PROJECT site within the Clyde community. However, the Contra Costa Countywide Bicycle and Pedestrian Plan proposes development of Class I routes along Waterfront Road and Lower Walnut Creek that connect to existing routes and would be located adjacent to the PROJECT area (CCTA 2018). The Contra Costa Countywide Bicycle and Pedestrian Plan also proposes adding a Class I route adjacent to Mallard Reservoir within an existing open space corridor that would cross Bates Avenue near the southeast corner of Mallard Reservoir.

5.17.2 Methodology

The PROJECT involves an eight-year construction period beginning in the year 2024. Hauling of soils and other materials resulting in off-site truck traffic is expected to be at the highest level during Year 1 and Year 6, with truck traffic associated with construction during Years 2 through 5 and Years 7 and 8 generally being lower. Therefore, the traffic memo was prepared to summarize the off-site truck traffic from the PROJECT during Year 1 and Year 6 construction activities as the worst-case conditions. The traffic memo is included as Appendix G.

5.17.3 Environmental Impact Analysis

This section discusses potential impacts on traffic and transportation associated with the PROJECT and provides mitigation measures where necessary.

Impact TRANS-1 Conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?

Impact Analysis

Construction

The PROJECT would involve remediation activities over a period of eight years that would generate the most truck trips in Year 1 and Year 6. Truck activities from Years 2 through 5 and Years 7 and 8 would generally be lower. Truck activities for the years are described below:

Year 1

Soils transport would be carried in CT660 tractor trailer trucks on I-680 toward Buttonwillow via SR Highway 4. These trucks would enter and exit the south gate and travel along Solano Way between the PROJECT site and SR Highway 4. It is anticipated that five trucks would make this drive daily for 20 working days, resulting in 10 average daily trips (ADT) (5 inbound trips, 5 outbound trips) added to Solano Way. Assuming an eight-hour workday, the average number of trucks on Solano Way would be one or two trucks per hour. In addition, conservatively assuming that



during the peak one-hour the number of trucks is twice the average, the number of trucks on Solano Road would be two to three trucks, which equates to approximately one truck every 24 minutes during the peak one-hour for 20 working days.

Materials deliveries would be made on CT660 tractor trailer trucks from Clear Lake and Dixon north of the PROJECT site via I-680. These trucks would enter and exit the North Gate and travel along Waterfront Road between the site and I-680. It is anticipated that five trucks would make the round-trip between the PROJECT site and Clear Lake twice each day for 40 working days for a total of 20 ADT (10 inbound, 10 outbound). Similarly, it is estimated that four trucks would make the round-trip between the site and Dixon three times a day for 33 working days, resulting in 24 ADT (12 inbound trips, 12 outbound trips).

Conservatively assuming that the Year 1 materials delivery phases from Clear Lake and Dixon overlap, the trucks headed toward I-680 along Waterfront Road would total 44 ADT. During an eight-hour workday, the average number of trucks on Waterfront Road would be approximately five to six trucks per hour. Also, conservatively assuming that during the peak one-hour the number of trucks is twice the average, the number of trucks on Waterfront Road would be 10 to 11 trucks, or approximately one truck every five or six minutes. This amount of truck traffic would continue for 33 working days, with approximately five trucks (i.e., one truck every 12 minutes) during the peak one-hour for the remaining 7 working days.

Year 6

During Year 6, gravel would be hauled in on CT660 tractor trailer trucks from Lake Herman Quarry via I-680. These trucks would enter and exit the North Gate and travel along Waterfront Road between the site and I-680. It is anticipated that five trucks would make two roundtrips each day for a total of 20 ADT (10 inbound trips, 10 outbound trips) for 180 working days. During a typical eight-hour workday, the average is two to three trucks per hour, or approximately five trucks during the peak one-hour—equivalent to one truck every 12 minutes.

The volume of construction truck traffic from the PROJECT on Waterfront Road or Solano Way during construction is insignificant and would have no noticeable effect on roadway traffic conditions. Therefore, traffic impacts from construction activities would be less than significant.

Operations

Post completion of remediation activities, operational activities would include regular inspections, maintenance, and repair of the WMUs. These activities would not generate a significant amount of traffic and some of the trips are anticipated to be absorbed by existing operational trips. Therefore, impacts would be less than significant.

There are currently no bike routes adjacent to the PROJECT site. Additionally, due to the nature and location of the PROJECT, it is unlikely that any employees would arrive via alternative travel modes, such as by bicycle or walking. Therefore, adverse traffic impacts relating to other modes of transportation would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.



Level of Significance After Mitigation

Less Than Significant Impact.

Impact TRANS-2 Would the project conflict or be inconsistent with CEQA Guidelines section 15064.3, subdivision (b)?

Impact Analysis

The PROJECT includes closure of WMUs and grading activities and is not a land use or transportation project that would result in substantial vehicle miles traveled (VMT). The PROJECT's traffic impacts are limited to construction activities and a less than significant impact would occur.

The Contra Costa County Transportation Analysis Guidelines (TAG) provides screening criteria to quickly determine if a proposed project should be expected to prepare a detailed VMT analysis. However, absent substantial evidence indicating that a project would generate a potentially significant level of VMT, projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than-significant impact under CEQA and would not require further VMT analysis.

As mentioned previously, ongoing operations of the PROJECT would generate substantially fewer than 110 trips per day, allowing the PROJECT to be screened out from requiring VMT analysis. Therefore, the PROJECT can be assumed to have a less than significant impact.

Construction-related VMT is addressed in the context of air quality and GHG as part of a separate study. The VMT associated with the PROJECT'S construction is temporary and not subject to the intent of CEQA Guidelines Section 15064.3, subdivision (b), which promotes the reduction of GHG emissions, the development of multimodal transportation networks, and a diversity of land uses; therefore, PROJECT-related construction impacts would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact TRANS-3 Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?

Impact Analysis

The PROJECT would involve construction of temporary and permanent access roads. As discussed in Section 3.0, Construction Methods, a TMP would be prepared that would include procedures, requirements, and provisions to be implemented to ensure the efficient and safe movement of vehicles on the Facility's roadways. The TMP would also



describe the routes and safe movement between the work and stockpile areas, WMUs, and staging areas. Traffic related to the PROJECT would be compatible with the kind of traffic generated by the existing Facility uses and surrounding developments in the PROJECT vicinity. The PROJECT does not propose to make changes to a roadway that would create road hazards or alter design features developed to mitigate such hazards. Therefore, impacts would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact TRANS-4 Result in inadequate emergency access?

Impact Analysis

The access roads would be maintained, as needed, to facilitate on-site circulation for emergency vehicles during all weather conditions. Therefore, impact would be less than significant.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



5.18 TRIBAL CULTURAL RESOURCES

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
3) Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined by Public Resources Code section 21047 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

5.18.1 Environmental Setting

Refer to Section 5.5, Cultural Resources, for the ethnographic contextual information.

5.18.2 Methodology

The cultural resources investigations carried out for the PROJECT included background research conducted at the NWIC of the California Historical Resources Information System, consultation opportunity for Native American Tribes (Appendix E and Section 5.5, Cultural Resources), and a review of historic maps and ethnographic documents.

The record search included a review of all cultural resources and reports within 0.25 mile of the PROJECT area, as presented in Section 5.5, Cultural Resources. The records search was conducted by reviewing the Office of Historic Preservation records, base maps, historic maps, and literature for Contra Costa County on file at the NWIC. Other sources reviewed included the Office of Historic Preservation Historic Properties Directory, California Inventory of Historical Resources, and ethnographic information.

There is one Native American Tribe that is traditionally and culturally affiliated with the geographic area of the PROJECT and that has requested that the SFBRWQCB provide written notification of projects pursuant to AB 52: Wilton Rancheria. On July 6, 2018, the SFBRWQCB sent notification of the PROJECT to Wilton Rancheria. The notification provided Wilton Rancheria with 30 days from receipt of the letter to request consultation. The SFBRWQCB did not receive a request for consultation.



5.18.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact TRIB-1	<p>Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined by Public Resources Code Section 21047 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:</p> <ul style="list-style-type: none">i. Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), orii. A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?
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Impact Analysis

Results of the archival records search performed as part of the cultural resources analysis indicate that no known tribal cultural resources (TCRs) are within or near the study area. Furthermore, the Facility has been operating for more than 100 years; therefore, the historical use of the PROJECT WMUs (and marshland prior to that) and surrounding area has been well documented.

At the time of publication of this document, the Native American community has not replied to the SFBRWQCB's letter describing the PROJECT, which also requested any additional information with regards to tribal resources or concerns in this area.

The PROJECT is not anticipated to have an impact on any known or potential TCRs. However, subsurface construction activities, such as excavation of waste material, the installation of shear panel walls backfilled with slurry, and/or grading, albeit unlikely, could potentially damage or destroy previously undiscovered unique TCRs. Mitigation Measures CUL-1 and CUL-2 require implementation of standard inadvertent discovery procedures and worker awareness training in order to reduce potential impacts to previously undiscovered subsurface unique TCRs. With the implementation of Mitigation Measures CUL-1 and CUL-2 potential impacts would be less than significant.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measures CUL-1 and CUL-2 are required.

Level of Significance After Mitigation

Less Than Significant Impact With Mitigation.



5.19 UTILITIES AND SERVICE SYSTEMS

Would the PROJECT:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
3) Result in a determination by the wastewater treatment provider that serves or may serve the Proposed Project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
5) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.19.1 Environmental Setting

Water Supply

Untreated water service to the PROJECT site is provided by the Contra Costa Water District (CCWD), which covers 220 square miles within central and eastern Contra Costa County (Contra Costa County 2005). The CCWD is required to update its Urban Water Management Plan every 5 years to comply with California's Urban Water Management Planning Act. The Urban Water Management Plan estimates current and future water demand and supply and proposes planning measures to ensure that water supply is adequately provided within the CCWD operational area (CCWD 2016). Water required for construction activity would be drawn from on-site water hydrants located within PROJECT staging areas located on Facility-owned property.

Wastewater

The Facility operates its own on-site Wastewater Treatment System under NPDES permit number CA0004961, which is effective from 2022 to 2027. The NPDES permit identified the Facility's Wastewater Treatment System average daily flow of 3.1 million gallons per day (MGD) with a hydraulic capacity of 11.5 MGD. However, the flow differs each year depending on the season, especially during the wet season when the level of stormwater increases and combines with industrial effluent. Treated wastewater from the Facility is discharged to Suisun Bay (SFBRWQCB 2021).



Stormwater

Stormwater drainage within Contra Costa County is managed by the Flood Control and Water Conservation District (Flood Control District). Treated stormwater is discharged to Suisun Bay, while the remaining stormwater is either directed to Lower Walnut Creek or Hastings Slough (SFBRWQCB 2021). The PROJECT site currently contains stormwater control pipes along the interior berms of WMUs 10/11/14 that would be removed.

Solid Waste Management

The Contra Costa County Health Services Department Environmental Health Division is certified by the California Integrated Waste Management Board as the local enforcement agency for solid waste in the County. The local enforcement agency is responsible for ensuring that all solid waste disposal facilities comply with all applicable local, state, and federal codes and regulations (Contra Costa Health Services 2018a).

Contra Costa County contains one active landfill: Keller Canyon Landfill at 901 Bailey Road in Pittsburg. Keller Canyon is not open to the public and does not accept hazardous materials (Contra Costa Health Services 2018b). The landfill is inspected monthly by the local enforcement agency. Keller Canyon Landfill is located approximately seven miles southwest of the PROJECT site and is expected to close in 2050 (CalRecycle 2023).

5.19.2 Methodology

The following analysis is based on a review of documents pertaining to the PROJECT site, including the Public Facilities/Services Element of the County General Plan, the Facility's NPDES permit, and Section 2.0, Project Description, of this ISMND.

5.19.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.

Impact UTIL-1	Require or result in the relocation or construction of new or expanded water, wastewater treatment, or stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?
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Impact Analysis

The PROJECT would not require the construction or expansion of wastewater facilities. Wastewater is not anticipated to be generated during PROJECT construction. However, in the event that wastewater is generated from groundwater dewatering to facilitate excavation, stormwater, dust, odor suppression liquid runoff from exposed WMU soil and waste, or there is excess water from soil/waste strengthening and compaction activities, the wastewater will be managed within the construction footprint in accordance with the Wastewater Handling Plan prepared as part of the Construction Work Plan. If necessary, wastewater may require on-site treatment prior to discharge.

Therefore, the PROJECT would have a less than significant impact.



Water Supply

The PROJECT is anticipated to require a total of approximately 300,000,000 gallons of water during the site preparation and closure construction phases for soil conditioning, dust control, and odor control. Water would be obtained from the Facility's on-site Fire Water system (valve or hydrant). Therefore, there would be a less than significant impact.

Stormwater

The PROJECT would involve the construction or expansion of stormwater drainage facilities. PROJECT construction activities would be completed in accordance with a PROJECT SWPPP meeting the requirements of the Construction Stormwater General Permit. The construction contractor would also prepare a Stormwater Handling Plan for the work as part of the Construction Work Plan. The PROJECT would require installation of a new surface water discharge location along the eastern side of WMUs 10/11/14. This location would accept surface waters from the restored wetlands and restored uplands, only, and not the Facility at large. The new surface water discharge location would direct surface water to the adjacent pond to the east, under the access road, providing relief across the road. As such, construction of the PROJECT would result in a new discharge location that would require the construction of a new stormwater drainage facility. Stormwater would be managed through approved BMPs. If necessary, stormwater may require temporary onsite treatment prior to discharge to a permitted discharge point under the existing NPDES permit. Temporary onsite treatment, if necessary, could include settlement units, filtration units, pH adjustment systems, and granular activated carbon units. These treatment units would be selected based on construction occurring and the nature of stormwater contact with construction and site related contaminants. Therefore, the PROJECT would have a less than significant impact.

Electric Power and Natural Gas

The PROJECT does not involve the construction or relocation of electric power or natural gas facilities. Portions of the PROJECT construction activities would require power which would connect to existing facilities at the PROJECT site. In addition, overhead powerlines would be removed prior to the start of construction activities as part of a separate Facility action. As such, no impacts related to the construction or relocation of electric power and natural gas facilities would occur.

Telecommunications

The PROJECT does not involve the construction or relocation telecommunication facilities. Therefore, no impacts related to the construction or relocation of telecommunication facilities would occur.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



Impact UTIL-2 Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

Impact Analysis

The PROJECT is expected to require approximately 300,000,000 gallons of water during site preparation and site closure phases that would be obtained from the Facility's on-site Fire Water system (valve or hydrant). No water usage is anticipated post closure. Therefore, PROJECT would not require new or expanded entitlements and would have a less than significant impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact UTIL-3 Result in a determination by the wastewater treatment provider that serves or may serve the proposed project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Impact Analysis

Wastewater treatment for the PROJECT site is provided by the existing on-site Wastewater Treatment System. As described, the NPDES permit identifies the Facility's Wastewater Treatment System average daily flow as 3.1 MGD and a hydraulic capacity of 11.5 MGD. However, the flow differs each year depending on the season, especially during the wet season when the level of stormwater increases and combines with industrial effluent. Wastewater generated by the PROJECT would represent approximately 1.4 percent of the Facility Wastewater Treatment System's capacity. As such, the Facility is expected to have adequate capacity to accommodate wastewater generated during PROJECT construction activities. Therefore, the PROJECT would have a less than significant impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.



Impact UTIL-4 Generate solid waste in excess of State or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals?

Impact Analysis

Construction activity would generate small amounts of solid waste, including existing poles, conductors, and related infrastructure for overhead electrical lines and abandoned facilities. Keller Canyon Landfill is the closest active landfill available to serve the PROJECT site. Keller Canyon is expected to remain in operation for the duration of the PROJECT and has a remaining capacity of approximately 63 million cubic yards and can accept up to 3,500 tons per day. Landfill capacity at this site would be more than adequate to serve the short-term construction-related disposal needs of the PROJECT. Therefore, there would be a less than significant impact.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact UTIL-5 Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Impact Analysis

During construction, the PROJECT contractor would be responsible for implementing BMPs and recycling construction waste related to solid waste and would comply with all applicable federal, state, and local statutes and regulations. Therefore, there would be no impact.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.20 WILDFIRE

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the PROJECT:				
1) Substantially impair an adopted emergency response plan or emergency evacuation plan?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

5.20.1 Environmental Setting

In Contra Costa County, wildland fires resulting from either natural or manmade causes can occur in grasslands, brushlands, woodlands, farmlands, undeveloped areas, and on large lot homesites with extensive areas of un-irrigated vegetation (Contra Costa County 2010). The PROJECT is located within an industrial area of Contra Costa County near Suisun Bay. The PROJECT site consists of the PROJECT WMUs. The PROJECT WMUs are inactive basins that were used for disposal of waste material. California Department of Forestry and Fire Protection (CAL FIRE) does not identify the PROJECT site in a state responsibility area, or within an area classified as a “very high fire hazard severity zone” (CAL FIRE 2023).

5.20.2 Methodology

The following analysis is based on a review of the Safety Element for the Contra Costa County General Plan and CAL FIRE’s Fire Hazard Severity Zones Maps.

5.20.3 Environmental Impact Analysis

This section discusses potential impacts associated with the PROJECT and provides mitigation measures where necessary.



Impact WF-1 Substantially impair an adopted emergency response plan or emergency evacuation plan?

Impact Analysis

The PROJECT site is not located in a state responsibility area or within a designated “very high fire hazard severity zone” (CAL FIRE 2023). The PROJECT would not involve permanent modification of existing roadways. During construction, access would be maintained in accordance with a TMP which would ensure adequate circulation and emergency access are provided to the PROJECT site. Therefore, the PROJECT would not interfere with an emergency evacuation or response plan. No impact would occur.

Level of Significance Before Mitigation

Less Than Significant Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

Less Than Significant Impact.

Impact WF-2 Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire?

Impact Analysis

The PROJECT site is not located in a state responsibility area or within a designated “very high fire hazard severity zone” (CAL FIRE 2023). In addition, the PROJECT does not involve the construction of structures intended for occupation. Therefore, the PROJECT would not expose occupants to pollutant concentrations from a wildfire or the uncontrolled spread of wildfire. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



Impact WF-3	Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?
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Impact Analysis

The PROJECT site is not located in a state responsibility area or within a designated “very high fire hazard severity zone” (CAL FIRE 2023). The PROJECT involves the closure of WMUs and mitigation and monitoring activities. None of the PROJECT activities involve the installation or operation of infrastructure that would exacerbate fire risk. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.

Impact WF-4	Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes?
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Impact Analysis

The topography of the PROJECT site is relatively flat, ranging from approximately 13 feet to 50 feet, and not located within an area susceptible to landslides. Furthermore, the PROJECT is not located in a state responsibility area or within a designated “very high fire hazard severity zone” (CAL FIRE 2023). Therefore, the PROJECT would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, post-fire slope instability, or drainage changes. No impact would occur.

Level of Significance Before Mitigation

No Impact.

Mitigation Measures

No mitigation is necessary.

Level of Significance After Mitigation

No Impact.



5.21 MANDATORY FINDINGS OF SIGNIFICANCE

Would the PROJECT:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
1) Have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2) Have impacts that are individually limited, but cumulative considerable? ("Cumulative considerable" means that the incremental impacts of a project are considerable when viewed in connection with the impacts of past projects, the impacts of other current projects, and the effects of probable future Projects)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3) Have environmental impacts which will cause substantial adverse impacts on human beings, either directly or indirectly?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Impact MFOS-1 Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?

Impact Analysis

The PROJECT would be integrated into the existing industrial character of the PROJECT site as it is an existing industrial and refining use. Construction and operation of the PROJECT would comply with all local, regional, state, and federal laws governing general welfare and environmental protection, and would not substantially degrade the quality of the existing environment. CEQA Guidelines Section 15065(a)(2) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the PROJECT has the potential to achieve short-term environmental goals to the disadvantage of long-term environmental goals. There would be temporary and minor adverse effects that would occur at the construction of the PROJECT; however, the overall improvement to the environment through restoration and clean-up would outweigh these short-term effects.

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the PROJECT has the potential to (1) substantially reduce the habitat of a fish or wildlife species; (2) cause a fish or wildlife population to drop below self-sustaining levels; or (3) substantially reduce the number or restrict the range of an endangered, rare, or threatened species. Section 5.4 (Biological Resources) of this Initial Study fully addresses any impacts that might relate to the reduction of



the fish or wildlife habitat, the reduction of fish or wildlife populations, and the reduction or restriction of the range of special-status species as a result of PROJECT implementation. This PROJECT would not contribute to the accumulation of impacts within the region. However, cumulative actions to habitats in the region are expected to provide long-term benefits to associated vegetation, wildlife, and fish. Because vegetation communities and wildlife habitats within the region have been substantially modified to suit human land uses and will likely continue to be modified as human populations increase, the PROJECT could have the potential to benefit SMHM and CRR species and their habitat by preserving and improving habitat. Mitigation Measures BIO-1, BIO-2, BIO-3, BIO-4, BIO-5, BIO-6, and BIO-7 have been included herein to reduce potential impacts to special-status species and habitats to a less than significant level.

CEQA Guidelines Section 15065(a)(1) states that a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to eliminate important examples of a major period of California history or prehistory. CEQA Guidelines Section 15065(a)(1) amplifies Public Resources Code Section 21001(c) by requiring preservation of major periods of California history for the benefit of future generations. It also reflects the provisions of Public Resource Code Section 21084.1 in requiring a finding of significance for substantial adverse changes to historical resources. CEQA Guidelines Section 15064.5 establishes standards for determining the significance of impacts to historical resources and archaeological sites that are an historical resource. Section 5.5 (Cultural Resources) of this Initial Study fully addresses impacts related to California history and prehistory, historic resources, archaeological resources, and paleontological resources. There are no examples of important periods of California history or prehistory that would be affected by the PROJECT. Mitigation Measures CUL-1, CUL-2, CUL-3, and GEO-2 have been included herein to reduce potential impacts of the inadvertent discovery of cultural resources to a less than significant level.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measures BIO-1 through BIO-7, CUL-1 through CUL-3, and GEO-2 are required.

Level of Significance After Mitigation

Less Than Significant Impact with Mitigation.

Impact MFOS-2 Does the project have impacts that are individually limited, but cumulative considerable? (“Cumulative considerable” means that the incremental impacts of a project are considerable when viewed in connection with the impacts of past projects, the impacts of other current projects, and the effects of probable future Projects)?

Impact Analysis

The CEQA Guidelines define cumulative impacts as “two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The individual effects may be changes resulting from a single project or increase in environmental impacts. The cumulative impact from several projects is the change in the environment which results from the incremental impact of the PROJECT when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result



from individually minor but collectively significant projects taking place over a period of time.” (CEQA Guidelines, Section 15355(a)(b)). Some aspects of the PROJECT have been identified as having the potential for significant environmental impacts. All cumulative impacts resulting from the PROJECT related to air quality, biology, geology, hydrology, and culture would be mitigated with implementation of Mitigation Measures AIR-1, BIO-1 through BIO-7, GEO-1 through GEO-2, HYD-1, and CUL-1 through CUL-2. Projects identified for evaluation to determine the cumulative impacts in conjunction with the PROJECT include the Pacheco Creek Restoration Project and the Martinez Refinery Renewable Fuels Project.

Impacts associated with the separate but related Pacheco Creek Restoration Project will be mitigated to a less than significant level as described in the County ISMND. The Martinez Refinery Renewable Fuels Project has been completed as generally described in the Martinez Refinery Renewable Fuels Project Environmental Impact Report, and resulted in significant impacts to air, hazards, biology, and hydrology (Contra Costa County Department of Conservation and Development 2021). However, as construction of the Martinez Refinery Renewables Fuels Project has been completed, impacts would not coincide with the PROJECT. The PROJECT impacts, as mitigated, together with the Pacheco Creek Restoration Project and the Martinez Refinery Fuels Project, as mitigated, will not result in a cumulatively significant impact.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measures AIR-1, BIO-1 through BIO-7, GEO-1 through GEO-2, HYD-1, and CUL-1 through CUL-2 are required.

Level of Significance After Mitigation

Less Than Significant Impact with Mitigation.

Impact MFOS-3 Does the project have environmental impacts which will cause substantial adverse impacts on human beings, either directly or indirectly?

Impact Analysis

As required by CEQA Guidelines Section 15065(a)(4), a lead agency shall find that a project may have a significant effect on the environment where there is substantial evidence that the project has the potential to cause substantial adverse effects on human beings, either directly or indirectly. Under this standard, a change to the physical environment that might otherwise be minor must be treated as significant if people would be significantly affected. This factor relates to adverse changes to the environment of human beings generally, and not to effects on particular individuals. While changes to the environment that could indirectly affect human beings would be represented by all of the designated CEQA issue areas, those that could directly affect human beings include air quality, geology and soils, hazards and hazardous materials, hydrology and water quality, noise, population and housing, public services, recreation, transportation/traffic, utilities, and climate change, which are addressed in Section 5.3 (Air Quality), Section 5.7 (Geology/Soils and Mineral Resources), Section 5.8 (Greenhouse Gas Emissions), Section 5.9 (Hazards and Hazardous Materials), Section 5.10 (Hydrology/Water Quality), Section 5.13 (Noise), Section 5.15 (Public Services and Recreation), Section 5.17 (Transportation), and Section 5.19 (Utilities/Service Systems). With mitigation measures set forth above, the PROJECT will have less than significant environmental effects that would directly or



indirectly impact human beings onsite or in the PROJECT vicinity. Therefore, the PROJECT would have less than significant impacts due to substantial adverse environmental effects on human beings.

Level of Significance Before Mitigation

Potentially Significant Impact.

Mitigation Measures

Mitigation Measures AIR-1, BIO-1 through BIO-7, GEO-1 through GEO-2, HYD-1, and CUL-1 through CUL-3 are required.

Level of Significance After Mitigation

Less Than Significant Impact with Mitigation.



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Appendix A
Construction and Grading Assumptions,
prepared by Stantec Consulting Services Inc.,
2023

APPENDIX A CONSTRUCTION AND GRADING ASSUMPTIONS

Construction and grading assumptions of each PROJECT component is presented below.

PROJECT COMPONENTS

The proposed construction and grading methods and mitigation and maintenance activities discussed in the following paragraphs were selected to reduce impacts to sensitive resources including jurisdictional waters and endangered species habitat to the maximum extent practicable. The details presented below reflect current designs still under refinement. Final designs and associated details will be contained in the Regional Water Quality Control Board (RWQCB) approved Title 27 Closure Plans for the respective Waste Management Units (WMU).

Closure of PROJECT WMUs

WMUs 10/11/14 – Waste Excavation and Restoration at WMUs 10 and 11; and Perimeter Berm Improvements, Waste Consolidation and Title 27 Compliant Cover at WMU 14

Closure at WMUs 10/11/14 involves excavating waste material from WMUs 10 and 11 (approximately 100,000 cubic yards) and placing the excavated waste into a consolidation cell with perimeter berm improvements constructed in the footprint of WMU 14 and installing a cover system. After excavation of WMUs 10 and 11 waste materials those areas would be restored.

The WMU 14 Consolidation Cell improvements include the following:

- Excavating a portion of WMU 14 and stockpiling excavated material at nearby staging areas;
- Installing a series of shear panel walls backfilled with a self-hardening slurry in the excavated area to hold the excavation open;
- Constructing a new perimeter berm at the WMU 14 Consolidation Cell, in the following order from bottom to top. The berms shall meet seismic requirements at the time of Closure Plan submittal, Title 27 requirements, and consider sea level rise height projections:
 - A layer of stabilizing geosynthetic fabric.
 - A one-foot-thick low-permeability soil layer beneath the new perimeter berm to provide a cover over potential waste below the new berm.
 - Improved perimeter berm with a final elevation of approximately +13 feet National Geodetic Vertical Datum of 1929 (NGVD 29), a 13-foot-wide crest and two-horizontal to one-vertical (2:1) side slopes.
 - A 60-millimeter high-density polyethylene (HDPE) geomembrane on the interior slopes to reduce potential migration through the berm.
 - A minimum one-foot-thick soil operations layer over the geomembrane on the interior slopes to protect the liner from damage by construction equipment during subsequent waste consolidation activities.
 - Rip-rap or other pervious erosion-resistant material on the exterior berm slopes to protect from wind and/or stormwater erosion.

A stormwater drainage channel will be constructed along the exterior edge of the northern, western, and southern berms, discharging onto the 100-foot-wide pervious upland transition zone and thence into the restored wetlands and uplands within the closed WMUs 10 and 11. Stormwater discharges from new impervious surfaces associated with the WMU 14 closure, if part of the final design and if discharging to jurisdictional waters such as closed WMUs 10 and 11 will be treated in accordance with Provisions C.3.c. and C.3.d. of the Municipal Regional Stormwater National Pollutant Discharge Elimination System (NPDES) Permit (NPDES Permit No. CAS612008).

The material excavated from WMU 14 would be stabilized, if necessary, by mixing other soils or cement to improve handling and compaction characteristics. The stabilized soils would be placed in the WMU 14 Consolidation Cell, spread, and compacted.

Waste materials would then be excavated from WMUs 10 and 11. Excavation work would proceed in small areas or cells and, if necessary, use shoring to allow better control of groundwater and to reduce sloughing soils. The excavated material would be stockpiled in nearby staging areas and would be stabilized, as necessary. Stabilized wastes and associated soils would be hauled to WMU 14 Consolidation Cell, placed, spread, and compacted. Active odor monitoring and odor control, when indicated by monitoring, will be employed during all active management of wastes.

The excavated areas in WMUs 10 and 11 would be backfilled with clean soil, and the existing perimeter berms would be reconstructed to the approximate current pre-excavation grades. WMUs 10 and 11 would be revegetated to restore the impacted wetlands and wildlife habitat in accordance with the Habitat Mitigation and Monitoring Plan (HMMP) (WRA Environmental Consultants [WRA] 2017).

After all excavated waste material from WMUs 10, 11, 14, and 31 (described below) is consolidated into the WMU 14 Consolidation Cell, final grading of the waste surface would be completed to create the cover foundation layer and the multi-layer cover system would then be constructed on top of the consolidated waste material, with a final cover elevation of up to approximately 40 feet above mean sea level (msl). The upper 2-feet of the consolidated waste would be the foundation layer and would be smoothed and prepared for the overlying geosynthetic layer. The final cover would consist of, from bottom to top:

- A two-foot-thick foundation layer (consolidated waste material).
- A blanket landfill gas (LFG) collection geocomposite and LFG collection strips.
- A 40-milimeter linear low-density polyethylene (LLDPE) geomembrane.
- A nonwoven cushion geotextile.
- A minimum 12-inch-thick pervious non-vegetated erosion-resistant surface layer.

An LFG collection system would be installed to prevent pressure build up under the LLDPE liner if gas is generated following construction of the cover system. The LFG collection system would consist of a blanket of double-sided geocomposite material, a series of six high transmissivity collection strips, and 26 vents that penetrate the geomembrane liner. The LFG collection system would be constructed as a passive system (e.g., no vacuum would be applied to the system); however, the system would include a four-inch diameter lateral header pipe connected to the collection strips so that it could be converted to an active system in the future, if required, based on monitoring results. The header pipe would be constructed along the eastern edge of the consolidated waste cell and terminate at the south end with a vertical standpipe.

The closure design also includes a 60-milimeter HDPE geomembrane at the tie-in between WMUs 14 and 17 (shown on Figure 2.0-3) to provide cover beneath the southern perimeter drainage channel and the area between the southern drainage channel and WMU 17.

WMU 31 – Waste Excavation and Consolidation at WMU 14 Consolidation Cell

Closure at WMU 31 involves excavating and consolidating the waste material into the WMU 14 Consolidation Cell using the same methods used at WMU 10 and 11, including excavation, stockpiling, stabilization, transport, and placement (approximately 200,000 cubic yards of waste). Waste excavated from the WMU 31 Oily Skim Pond (OSP) would be treated and transported to the WMU 14 Consolidation Cell. Active odor monitoring and odor control, when indicated by monitoring, will be employed during all active management of wastes. If transported by truck, all loads of waste will be tarped. The excavated areas at WMU 31 would be backfilled with clean soil and revegetated to restore the impacted wetlands and wildlife habitat in accordance with the HMMP. Where conditions warrant, geosynthetic fabric may be placed prior to backfilling to provide support for the imported backfill soils.

WMU 32 – Title 27 Compliant Cover

Closure at WMU 32 involves placement of a Title 27 compliant cover over existing surface and subsurface waste material. Capping may include, but is not limited to, leveling the site by grading flat the current interior berms, placement of a foundation material, installation of an LFG collection system, and installation of the Title 27 compliant cover. The WMU 32 closure construction shall meet seismic requirements at the time of Closure Plan submittal, Title 27 requirements, and consider sea level rise height projections.

WMU 32 will be graded for placement of the foundation layer for the cover and the multi-layer cover system would then be constructed. The cover system would be placed above the existing surface soils and would be constructed to maintain drainage off the WMU. The final cover, from bottom to top, would consist of:

- A foundation layer made of soils.
- Geotextiles.
- Geomembranes.
- A clean fill material. (the current design calls for a lightweight expanded polystyrene (EPS) construction fill material)
- An LFG collection/discharge system that would consist of a blanket geocomposite, collection strips, and/or conveyance pipes.
- A LLDPE geomembrane and a cushion geotextile.
- An erosion-resistant layer that may consist of synthetic materials, rock, and/or a vegetated soil. (the current design calls for the commercially produced Closure Turf product: an impermeable, impervious synthetic cover frequently used for other waste management unit closures)

The LFG collection system would be installed to prevent pressure build up if gas is generated following construction of the cover system and would be constructed as a passive system (e.g., no vacuum would be applied to the system).

Wetland Impacts and Mitigation

Closure of the PROJECT WMUs would result in permanent impacts to 27.05 acres of jurisdictional waters. The 18.58 acres of impacted area located within WMUs 10, 11 and 31 would be restored within these WMU areas following closure activities, so losses would be temporal in nature. Construction of Title 27 covers at WMUs 14 and 32 would result in permanent impacts to 8.47 acres of jurisdictional waters. To offset permanent impacts to jurisdictional waters, the Applicant will restore wetlands onsite, has acquired and completed grading on, and dedication of a property referred to here as the Suisun Properties land to the John Muir Land trust for incorporation into the Lower Walnut Creek Restoration Project (see below), and has purchased 8.47 wetlands credits at Wildlands' North Suisun Mitigation Bank.

Special Status Species Impacts and Mitigation

Closure of the PROJECT WMUs would result in temporary impacts to 5.46 acres of SMHM wetland habitat and 19.18 acres of SMHM upland habitat; these impacts would be restored within 12 to 24 months following the impacts. However, a total of 2.96 acres of SMHM wetland habitat and 8.31 acres of seasonal SMHM upland habitat would be permanently impacted. To offset the temporary and permanent impacts to SMHM habitat, the Applicant would ensure the preservation and management of 83.09 acres of SMHM habitat at the established Cordelia Slough Preserve, as approved by the U.S. Fish and Wildlife Service (USFWS).

Suisun Properties Mitigation Land

The Applicant has acquired and completed grading on a property referred to here as the Suisun Properties land, a 19-acre site that abuts the Suisun Bay and is adjacent to the site for the Lower Walnut Creek Restoration Project, a watershed enhancement project developed in a partnership between the John Muir Land Trust and the Contra Costa Flood Control and Water Conservation District. Following completion of grading, the Suisun Properties land was dedicated to the John Muir Land Trust for incorporation into the Lower Walnut Creek Restoration Project. The impacts associated with the initial grading and the Restoration Project were analyzed in Contra Costa County Public Works Department Initial Study of Environmental Significance for the Lower Walnut Creek Restoration Project (Project Number 7520-6B-8285 (County ISMND)).

Appendix B
Air Quality Modeling Outputs and Energy
Calculations, prepared by Stantec Consulting
Services Inc., 2023

Alternative 1

Construction Year	Source									
		ROG	CO	NO _x	SO _x	PM ₁₀ Exhaust	PM _{2.5} Exhaust	PM ₁₀ Fugitive	PM _{2.5} Fugitive	MTCO _{2e}
Year 1 (WMU 14 Consolidati on Cell)	Project Emissions (Tons/Year)	0.33	8.84	2.09	0.02	0.07	0.06	3.12	0.52	1667.22
	Average Daily Emissions (lbs/day)	2.71	73.69	17.43	0.16	0.60	0.51	26.00	4.30	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 2 (WMU 10/11))	Project Emissions (Tons/Year)	0.37	11.05	2.65	0.02	0.08	0.07	9.22	1.15	2096.66
	Average Daily Emissions (lbs/day)	3.08	92.07	22.07	0.20	0.70	0.57	76.86	9.62	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 3 (WMU 10/11)	Project Emissions (Tons/Year)	0.39	11.53	2.83	0.03	0.09	0.07	10.42	1.04	2300.55
	Average Daily Emissions (lbs/day)	3.26	96.08	23.61	0.22	0.72	0.57	86.81	8.68	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 4 (WMU 31)	Project Emissions (Tons/Year)	0.39	11.53	2.83	0.03	0.09	0.07	11.04	1.33	2300.55
	Average Daily Emissions (lbs/day)	3.26	96.08	23.61	0.22	0.72	0.57	91.96	11.06	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 5 (WMU 31)	Project Emissions (Tons/Year)	0.39	11.53	2.83	0.03	0.09	0.07	11.03	1.33	2300.59
	Average Daily Emissions (lbs/day)	3.26	96.08	23.61	0.22	0.72	0.57	91.96	11.11	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 6 (WMU 14 Cover)	Project Emissions (Tons/Year)	0.19	5.11	1.49	0.01	0.05	0.04	0.56	0.06	971.03
	Average Daily Emissions (lbs/day)	2.16	56.83	16.57	0.12	0.53	0.41	6.26	0.63	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 7 (WMU 32)	Project Emissions (Tons/Year)	0.76	7.32	4.33	0.02	0.13	0.11	3.64	0.58	1898.26
	Average Daily Emissions (lbs/day)	8.63	83.66	49.44	0.26	1.45	1.22	41.61	6.67	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	
Year 8 (WMU 32)	Project Emissions (Tons/Year)	0.57	9.25	4.17	0.02	0.14	0.13	0.82	0.30	2075.12
	Average Daily Emissions (lbs/day)	6.55	105.75	47.68	0.26	1.62	1.49	9.34	3.44	
	BAAQMD Threshold of Significance	54	N/A	54	N/A	82	54	N/A	N/A	
	Exceed Threshold (Y/N?)	N	N/A	N	N/A	N	N	N/A	N/A	

15609.98

520.3327

Year	Work Days	<updated
1	240	
2	240	
3	240	
4	240	
5	240	
6	180	
7	175	

Alternative 1

8

175

X

240

lbs to tons

2000

YEAR 1 OFF-ROAD EQUIPMENT

Equipment	Horsepower	Load Factor	Emission Factors (g/bhp-hr)							
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
CUV102D utility vehicle	25	0.5	0.236	3.30432	1.68277	0.005	0.081	0.074	470.2917	0.152
Portable generator	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Forklift (TH255C)	74	0.4	0.12	3.7	2.74	0.005	0.008	0.008	471.5285	0.153
Kuma Odex Powerhouse	322	0.74	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154
Stormwater Pumps	5	0.74	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
Excavator PC 400	305	0.38	0.06	2.2	0.26	0.005	0.008	0.008	469.8892	0.152
Haul Truck CAT 730	329	0.38	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154
Dozer CAT D6	165	0.43	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
Excavator CAT 320	164	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
Loader CAT 966	170	0.38	0.06	3.7	0.26	0.005	0.008	0.008	468.7518	0.152
Excavator PC 200	110	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
140M AWD motor grader	183	0.41	0.06	2.2	0.26	0.005	0.008	0.008	473.9256	0.153
Compactor CAT 563	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Generator - 125kv	167	0.74	0.211	2.927	1.635	0.006	0.071	0.071	568.299	0.019

Tier 4

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

YEAR 2 OFF-ROAD EQUIPMENT

Equipment	Horsepower	Load Factor	Emission Factors (g/bhp-hr)							
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
CUV102D utility vehicle	25	0.5	0.236	3.30432	1.68277	0.005	0.081	0.074	470.2917	0.152
Portable generator	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Forklift (TH255C)	74	0.4	0.12	3.7	2.74	0.005	0.008	0.008	471.5285	0.153
Small powerhouse	322	0.74	0.06	2.2	0.26	0.005	0.008	0.008	568.299	0.014
450F backhoe	128	0.37	0.06	3.7	0.26	0.005	0.008	0.008	468.821	0.152
950M wheel loader	250	0.37	0.06	2.2	0.26	0.005	0.008	0.008	469.7518	0.152
Cat 336F Excavator	322	0.38	0.122	1.05093	0.89311	0.005	0.03	0.028	469.8892	0.152
Cat 374F Excavator	485	0.38	0.122	1.05093	0.89311	0.005	0.03	0.028	469.8892	0.152
Telehandler (T11255D) (marsh mats other supplies)	142	0.31	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
Drill Rig (Well Abandonment/Installation)	475	0.5	0.101	0.98883	0.89764	0.005	0.03	0.028	464.0407	0.15
D6 bulldozer	165	0.43	0.06	3.7	0.26	0.005	0.008	0.008	471.7805	0.153
D4 bulldozer	48	0.43	0.12	4.1	2.75	0.005	0.008	0.008	516.1587	0.167
272D2 XHP skid steer	98	0.37	0.153	3.26613	2.03854	0.005	0.069	0.063	472.656	0.153
973D Track loader	210	0.37	0.06	2.2	0.26	0.005	0.008	0.008	469.7518	0.152
Large Powerhouse (for batch plant)	811	0.74	0.81	1.39596	1.81226	0.005	0.069	0.063	476.1847	0.154
140M AWD motor grader	183	0.41	0.284	1.25173	3.44101	0.005	0.111	0.103	473.9256	0.153
160M3 AWD motor grader	213	0.41	0.284	1.25173	3.44101	0.005	0.111	0.103	473.9256	0.153
CP76 vib soil compactor	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
CS76 XT vib soil compactor	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
2-inch trash pump (collect and pump surface/groundwater to sewer)	4	0.74	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
950M wheel loader	250	0.37	0.21	1.17136	2.05963	0.005	0.069	0.063	469.824	0.152
Dewalt 80-gallon compressor (liner construction and testing)	5	0.48	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
Portable generator (Linear welding)	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Asphalt paver AP225	46	0.42	1.007	5.00667	4.28484	0.005	0.299	0.275	526.8595	0.17
Asphalt Compactor CB36B	48	0.38	0.661	4.25236	3.9211	0.005	0.212	0.195	525.8616	0.17
Asphalt Compactor CB7	248	0.38	0.188	1.23448	2.17272	0.005	0.76	0.07	473.5164	0.153
Haul Truck CAT 730	329	0.38	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

YEAR 3 OFF-ROAD EQUIPMENT

Equipment	Horsepower	Load Factor	Emission Factors (g/bhp-hr)							
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
CUV102D utility vehicle	25	0.5	0.236	3.30432	1.68277	0.005	0.081	0.074	470.2917	0.152
Portable generator	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Forklift (TH255C)	74	0.4	0.12	3.7	2.74	0.005	0.008	0.008	471.5285	0.153
Kuma Odex Powerhouse	322	0.74	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154
Stormwater/Dewatering Pumps	5	0.74	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
Excavator PC 400	305	0.38	0.06	2.2	0.26	0.005	0.008	0.008	469.8892	0.152
D6 bulldozer	165	0.43	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
Excavator CAT 320	164	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
Loader CAT 966	170	0.37	0.06	3.7	0.26	0.005	0.008	0.008	468.7518	0.152
Excavator PC 200	110	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
140M AWD motor grader	183	0.41	0.06	2.2	0.26	0.005	0.008	0.008	473.9256	0.153
Compactor CAT 563	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Generator - 125kv	167	0.74	0.211	2.927	1.635	0.006	0.071	0.071	568.299	0.019

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

YEAR 4 OFF-ROAD EQUIPMENT

Equipment	Horsepower	Load Factor	Emission Factors (g/bhp-hr)							
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
CUV102D utility vehicle	25	0.5	0.236	3.30432	1.68277	0.005	0.081	0.074	470.2917	0.152
Portable generator	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Forklift (TH255C)	74	0.4	0.12	3.7	2.74	0.005	0.008	0.008	471.5285	0.153
Kuma Odex Powerhouse	322	0.74	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154
Stormwater/Dewatering Pumps	5	0.74	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
Excavator PC 400	305	0.38	0.06	2.2	0.26	0.005	0.008	0.008	469.8892	0.152
D6 bulldozer	165	0.43	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
Excavator CAT 320	164	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
Loader CAT 966	170	0.37	0.06	3.7	0.26	0.005	0.008	0.008	468.7518	0.152
Excavator PC 200	110	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
140M AWD motor grader	183	0.41	0.06	2.2	0.26	0.005	0.008	0.008	473.9256	0.153
Compactor CAT 563	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Generator - 125kv	167	0.74	0.211	2.927	1.635	0.006	0.071	0.071	568.299	0.019

EMFAC 2017 Emission Rates (version 1.02)
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EMFAC 2011 Vehicle Categories

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

EMFAC 2017 Emission Rates (version 1.02)
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Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

YEAR 5 OFF-ROAD EQUIPMENT

Equipment	Horsepower	Load Factor	Emission Factors (g/bhp-hr)							
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
CUV102D utility vehicle	25	0.5	0.236	3.30432	1.68277	0.005	0.081	0.074	470.2917	0.152
Portable generator	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Forklift (TH255C)	74	0.4	0.12	3.7	2.74	0.005	0.008	0.008	471.5285	0.153
Kuma Odex Powerhouse	322	0.74	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154
Stormwater/Dewatering Pumps	5	0.74	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
Excavator PC 400	305	0.38	0.06	2.2	0.26	0.005	0.008	0.008	469.8892	0.152
D6 bulldozer	165	0.43	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
Excavator CAT 320	164	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
Loader CAT 966	170	0.37	0.06	3.7	0.26	0.005	0.008	0.008	468.7518	0.152
Excavator PC 200	110	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
140M AWD motor grader	183	0.41	0.06	2.2	0.26	0.005	0.008	0.008	473.9256	0.153
Compactor CAT 563	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Generator - 125kv	167	0.74	0.211	2.927	1.635	0.006	0.071	0.071	568.299	0.019

468.0546

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Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

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Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006

Vehicle Information			Emission Factor (grams/mile)																
Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
							Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

YEAR 7-8 OFF-ROAD EQUIPMENT

Equipment	Horsepower	Load Factor	Emission Factors (g/bhp-hr)							
			ROG	CO	NOX	SOX	PM10	PM2.5	CO2	CH4
CUV102D utility vehicle (Side by Sides)	25	0.5	0.236	3.30432	1.68277	0.005	0.081	0.074	470.2917	0.152
Portable generator	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Forklift (TH255C)	74	0.2	0.12	3.7	2.74	0.005	0.008	0.008	471.5285	0.153
Kuma Odex Powerhouse	322	0.74	0.06	2.2	0.26	0.005	0.008	0.008	476.1847	0.154
Stormwater Pumps	5	0.74	0.698	3.508	4.359	0.008	0.194	0.194	568.299	0.063
Generator - 125kv	167	0.74	0.211	2.927	1.635	0.006	0.071	0.071	568.299	0.019
Generator - 575 kv	770	0.74	0.16	0.986	1.253	0.005	0.037	0.037	568.299	0.014
Compressor 18	18	0.48	0.728	2.407	4.447	0.007	0.186	0.186	568.3	0.065
Pump - Godwin CD-150M	75	0.74	0.299	3.398	2.511	0.006	0.123	0.123	568.299	0.026
Excavator PC 200	110	0.38	0.06	3.7	0.26	0.005	0.008	0.008	467.1573	0.151
Excavator PC 450	323	0.38	0.06	2.2	0.26	0.005	0.008	0.008	469.8892	0.152
Compactor CAT 563	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Dozer CAT D6	165	0.43	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
Loader CAT 966	170	0.37	0.06	3.7	0.26	0.005	0.008	0.008	468.7518	0.152
Compactor CAT 815	170	0.42	0.06	3.7	0.26	0.005	0.008	0.008	469.5579	0.152
140M AWD motor grader	183	0.41	0.06	2.2	0.26	0.005	0.008	0.008	473.9256	0.153
450F backhoe	128	0.37	0.06	3.7	0.26	0.005	0.008	0.008	468.821	0.152
CP76 vib soil compactor	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Drill Rig (Well Abandonment/Installation)	475	0.5	0.101	0.98883	0.89764	0.005	0.03	0.028	464.0407	0.15
973D Track loader	210	0.37	0.06	2.2	0.26	0.005	0.008	0.008	469.7518	0.152
CP76 vib soil compactor	145	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
D4 bulldozer	48	0.43	0.12	4.1	2.75	0.005	0.008	0.008	516.1587	0.167
Portable generator (Linear welding)	18	0.74	0.701	2.407	4.447	0.007	0.182	0.182	568.299	0.063
Welders	46	0.45	0.697	4.596	3.891	0.007	0.151	0.151	568.299	0.062
Boom Trucks/Dump Trucks	280	0.38	0.187	2.22057	1.32428	0.005	0.048	0.044	475.0488	0.154
Trenchers	78	0.5	0.504	3.76842	4.70045	0.005	0.326	0.3	475.6903	0.154
String Trimmers	1.4	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Telehandlers	63	0.31	0.1	3.17029	1.5481	0.005	0.027	0.025	472.1142	0.153
Tracked Bobcat	55	0.42	0.273	3.14152	2.69821	0.005	0.14	0.129	469.5579	0.152
Generators for Hand Tools	6	0.74	0.618	3.508	4.345	0.008	0.186	0.186	568.299	0.055

[appendix-d2020-4-0-full-merge.pdf \(aqmd.gov\)](#)

*Sox, CO2, and CH4 emissions do not take into account Tier 4 reductions

Tier 4

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

2023	Vehicle Information			Emission Factor (grams/mile)																
	Type	Fuel	VMT	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
								Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
LDA	GAS	12783779	0.010037	0.771435	0.047752	0.002805	0.001316633	0.008000002	0.007363984	0.0154	0.0167	0.0012106	0.002	0.00257739	0.0046	0.0058	283.7744	0.002574	0.005034	
LDA	DSL	43468.1681	0.026301	0.324171	0.224887	0.002247	0.016282489	0.008000002	0.007479353	0.0155	0.0318	0.01557812	0.002	0.00261777	0.0046	0.0202	237.1689	0.001222	0.037366	
LDA	Electric	777009.899	0	0	0	0	0	0.008000002	0.004371802	0.0124	0.0124	0	0.002	0.00153013	0.0035	0.0035	0	0	0	
LDT1	GAS	1179551.07	0.030196	1.498317	0.141318	0.003324	0.001955323	0.008000002	0.008914397	0.0169	0.0189	0.00179791	0.002	0.00312004	0.0051	0.0069	336.2327	0.006794	0.010314	
LDT1	DSL	234.181883	0.303743	1.894083	1.571202	0.003943	0.22922346	0.008000002	0.010199191	0.0182	0.2474	0.21930735	0.002	0.00356972	0.0056	0.2249	416.1105	0.014108	0.065558	
LDT1	Electric	2606.53964	0	0	0	0	0	0.008000002	0.004394197	0.0124	0.0124	0	0.002	0.00153797	0.0035	0.0035	0	0	0	
LDT2	GAS	6246459.65	0.011791	0.86364	0.074237	0.00349	0.001361582	0.008000002	0.008583915	0.0166	0.0179	0.00125193	0.002	0.00300437	0.0050	0.0063	353.0288	0.003016	0.006322	
LDT2	DSL	26711.6613	0.013229	0.131399	0.051739	0.003066	0.005579898	0.008000002	0.008563057	0.0166	0.0221	0.00533851	0.002	0.00299707	0.0050	0.0103	323.5579	0.000614	0.050977	
LDT2	Electric	20038.9046	0	0	0	0	0	0.008000002	0.004355695	0.0124	0.0124	0	0.002	0.00152449	0.0035	0.0035	0	0	0	
Weighted Average for Employees			0.011	0.808	0.059	0.003	0.001	0.008	0.008	0.016	0.017	0.001	0.002	0.003	0.005	0.006	296.422	0.003	0.006	

2023	Vehicle Information			Emission Factor (grams/mile)																
	Type	Fuel	Speed	ROG	CO	NO _x	SO _x	PM ₁₀					PM _{2.5}					CO ₂	CH ₄	N ₂ O
								Exhaust	TW	BW	TW+BW	Total	Exhaust	TW	BW	TW+BW	TOTAL			
T7 Tractor Construction	DSL	5	0.634936	1.408844	20.80513	0.033288	0.137890759	0.035143111	0.078866581	0.1140	0.2519	0.13192567	0.00878578	0.0276033	0.0364	0.1683	3515.374	0.029491	0.553849	
T7 Tractor Construction	DSL	15	0.06076	0.432448	6.099385	0.024724	0.014480617	0.035143111	0.078866581	0.1140	0.1285	0.01385419	0.00878578	0.0276033	0.0364	0.0502	2610.913	0.002822	0.41135	
T7 Tractor Construction	DSL	40	0.016608	0.11736	2.19345	0.015406	0.012974017	0.035143111	0.078866581	0.1140	0.1270	0.01241277	0.00878578	0.0276033	0.0364	0.0488	1626.975	0.000771	0.256331	

ROG, CO, NO_x, SO_x, and CO₂ from EMFAC for select speeds. TW, BW for PM₁₀ and PM_{2.5} from aggregated speeds

IDLING HHD

Vehicle Information		Idling Emission Factor (grams/vehicle per day)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	5.103152	73.92679	63.49015	0.115761	0.035178443	0.033656639	12224.69758	0.237028175	1.926006

Methane emissions from TOG - ROG

Start Up HHD

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
T7 Tractor Construction	DSL	0	0	2.822279	0	0	0	0	0	0

Start up Light Duty Vehicles

Vehicle Information		Start Up Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.259077	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.232135	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Hot Soak Light Duty Vehicles

Vehicle Information		Hot Soak Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.099								
Ford F150 LDT2	GAS	0.088706								

Run Loss Light Duty Vehicles

EMFAC 2017 Emission Rates (version 1.02)
Calendar Year 2020
EMFAC 2011 Vehicle Categories

Vehicle Information		Run Loss Emission Factor (grams/trip)							
Type	Fuel	ROG							
Weighted Average	All	0.259077							
Ford F150 LDT2	GAS	0.232135							

Summary of Start up, Hot Soak, Run Loss

Vehicle Information		Summary of Start up, Hot Soak, Run Loss Emission Factor (grams/trip)								
Type	Fuel	ROG	CO	NO _x	SO _x	PM ₁₀	PM _{2.5}	CO ₂	CH ₄	N ₂ O
Weighted Average	All	0.617154	3.710453	0.304693	0.001355	0.002165	0.0012	62.55269355	0.081784	0.03529
Ford F150 LDT2	GAS	0.552976	3.989951	0.365564	0.000896	0.00218	0.0012	76.58935176	0.090461	0.039756

Rest Loss Light Duty Vehicles

Vehicle Information		Rest Loss Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	0							
Ford F150 LDT2	GAS	0							

Diurnal Light Duty Vehicles

Vehicle Information		Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Summary of Rest Loss and Diurnal for Light Duty Vehicles

Vehicle Information		Summary of Rest Loss and Diurnal Emission Factor (g/vehicle/day)							
Type	Fuel	ROG							
Weighted Average	All	1.430285							
Ford F150 LDT2	GAS	1.551305							

Storage Pile Fugitive Dust Emissions

Emission factors from storage piles are based on the BAAQMD Permit Handbook. According to the BAAQMD, emission factors for storage piles are taken from USEPA AP-42 Chapter 13.2.4, Aggregate Handling and Storage Piles. The emission factors include emissions from drop operations into storage piles. During construction, storage piles will be covered.

$$E = k(0.0032)(U/5)^{1.3}/(M/2)^{1.4}$$

where,^a

Variable	Description	Input Values
E =	Emission Factor (lb/ton)	N/A
k =	Particle size multiplier (dimensionless)	0.35
U =	mean wind speed (miles/hr)	8.20
M =	material moisture content	2.40

Notes:

^a BAAQMD. Permit Handbook: Engineering Division. See PDF page 182. <https://www.baaqmd.gov/~media/files/engineering/permit-handbook/baaqmd-permit-handbook.pdf?la=en&msclkid=e3c22aa3aacc11ecb830137e5f5a89d0>

Calculated E_{drop} operations = **0.001650674 lb/ton**

Total Storage Pile Emissions

Pollutant	Emission Factor (lb/ton)	Watering Stockpile Reduction ^b	Reduced Emission Factor (lb/ton)	Adjust Emission Factor (lb/ton) ^c	Adjust Emission Factor (lb/CY) ^d
PM10	0.001650674	70%	0.001155472	0.002310943	0.002921033
PM2.5 ^a	0.000280615	70%	0.00019643	0.00039286	0.000496576

^a PM2.5 emissions assumed to be 17% of the PM10 emissions for fugitive dust sources per the USEPA's Examination of the Multiplier Used to Estimate PM2.5 Fugitive Dust Emissions from PM10.

<https://www3.epa.gov/ttnchie1/conference/ei14/session5/pace.pdf?msclkid=fb1d4352b45911ec8e89c747223706a6>

^b Implementation of APM AQ-1 was assumed to reduce fugitive emissions by water application to stockpiles and covering stockpiles during windy conditions. The following reduction factor was taken from BAAQMD Permit Handbook.

^c Excavated material will move from ground to truck, truck to stockpile. Backfilled material will move from stockpile to truck, truck to ground. As such total excavated material was assumed to be moved twice (multiplied by 2) and total backfilled material was assumed to be moved twice (multiplied by 2). Since annual cut/fill accounts for total material movement (i.e. both excavation and backfill), the total emissions were multiplied by two to account for all material movement.

^d CalEEMod 2020.4.0 User's Guide, Appendix A, page 11. 1 CY = 1.264 tons

Year	Working Day per Year	Cubic Yards	Emissions		Emissions	
			PM10 (lbs/year)	PM2.5 (lbs/year)	PM10 (lbs/day)	PM2.5 (lbs/day)
1	240	117,500	343.2213197	58.34762435	1.430088832	0.243115101
2	240	304,500	889.4543988	151.2072478	3.706059995	0.630030199
3	240	194,667	568.6286353	96.666868	2.36928598	0.402778617
4	240	194,667	568.6286353	96.666868	2.36928598	0.402778617
5	240	194,667	568.6286353	96.666868	2.36928598	0.402778617
6	180	0	0	0	0	0
7	175	6,000	17.52619505	2.979453159	0.100149686	0.017025447
8	175	6,000	17.52619505	2.979453159	0.100149686	0.017025447

Fugitive Dust from Grading

Fugitive dust emissions from grading were based on CalEEMod, Appendix A. CalEEMod has designated specific types of equipment used in grading activities that can generate fugitive dust emissions. The type of equipment responsible for fugitive dust emissions during grading activities are crawler tractors, graders, rubber tired dozers, and scraper. CalEEMod incorporates dust calculation methods from EPA AP-42 Emission Factors, Section 11.9, Western Surface Coal Mining.

PM10^a
 $EF_{PM10} = 0.051 \times (S)^{2.0}$
 $EF_{PM10} = EM_{PM10} \times F_{PM10}$

PM2.5^a
 $EF_{PM2.5} = 0.04 \times (S)^{2.5}$
 $EF_{PM2.5} = EF_{TSP} \times F_{PM2.5}$

where,

Variable	Description	Input Values ^b
EF=	emission factor (lb/VMT)	-
S=	mean vehicle speed (mph)	7.1
F _{PM2.5} =	PM2.5 scaling factor	0.031
F _{PM10} =	PM10 scaling factor	0.6

Notes:

^a Equations from CalEEMod 2020.4.0 User's Guide, Appendix A.

^b Input values from USEPA AP-42.

$E = EF \times VMT$

$VMT = As / Wb \times 43,560 \text{ (SF/acre)} / 5,280 \text{ (ft/mile)}$

where,

Variable	Description
E=	emissions (lb)
EF=	emission factor (lb/VMT)
VMT=	vehicle miles traveled (mile)
As=	the arceage of the grading site (acre)
Wb=	Blade width of the grading equipment. The CalEEMod program default blade wide of 12 feet based on Catepillar's 140 Motor Grader.

Notes:

Equations from CalEEMod 2020.4.0 User's Guide, Appendix A.

Pollutant	Construction Year															
	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.6
EF (lb/VMT) ^a	1.54	0.17	1.54	0.17	1.54	0.17	1.54	0.17	1.54	0.17	1.54	0.17	1.54	0.17	1.54	0.17
Acres Disturbed	26.80	26.80	44.00	44.00	22.50	22.50	22.50	22.50	22.50	22.50	0.00	0.00	24.50	24.50	24.50	24.50
VMT per year	18.43	18.43	30.25	30.25	15.47	15.47	15.47	15.47	15.47	15.47	0.00	0.00	16.84	16.84	16.84	16.84
Emissions (lbs/year)	28.42	3.07	46.66	5.04	23.86	2.58	23.86	2.58	23.86	2.58	0.00	0.00	25.98	2.81	25.98	2.81
Emissions Reduction ^b	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Adjusted Emissions (lbs/year)	19.89	2.15	32.66	3.53	16.70	1.80	16.70	1.80	16.70	1.80	0.00	0.00	18.18758	1.963832	18.18758	1.963832

Notes:

^a Equations from CalEEMod 2020.4.0 User's Guide, Appendix A for grading emissions.

^b Implementation of APM AQ-1 was assumed to reduce fugitive emissions by water application to stockpiles and covering stockpiles during windy conditions. The following reduction factor was taken from BAAQMD Permit Handbook.

Fugitive Dust from Bulldozing

Fugitive dust emissions from grading were based on CalEEMod, Appendix A. Similar to the grading equipment passes emission estimation, the bulldozing emission factors for PM10 and PM2.5 are scaled from those of PM15 and TSP based on Section 11.9 of USEPA AP-42.

PM10^a **PM2.5^a**
 $EF_{PM10} = (C_{PM15} \times s^{1.5}) / M^{1.4}$ $EF_{TSP} = (C_{TSP} \times s^{1.5}) / M^{1.3}$
 $EF_{PM10} = EM_{PM15} \times F_{PM10}$ $EF_{PM2.5} = EF_{TSP} \times F_{PM2.5}$

where,

Variable	Description	Input Values ^b
EF=	emission factor (lb/hour)	-
C _{TSP} =	arbitrary coefficient used by AP-42 for TSP	5.7
C _{PM15} =	arbitrary coefficient used by AP-42 for PM15	1
M=	Material Moisture Content (%)	7.90%
S=	Material Silt Content (%)	6.90%
F _{PM2.5} =	PM2.5 scaling factor	0.105
F _{PM10} =	PM10 scaling factor	0.75

Notes:

^a Equations from CalEEMod 2020.4.0 User's Guide, Appendix A.

^b Input values from USEPA AP-42.

E = EF x Hr

where,

Variable	Description
E=	emissions (lb)
EF=	emission factor (lb/Hr)
Hr=	Hours of operation

Notes:

Equations from CalEEMod 2020.4.0 User's Guide, Appendix A.

Pollutant	Construction Year															
	Year 1		Year 2		Year 3		Year 4		Year 5		Year 6		Year 7		Year 8	
	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
EF (lb/Hr) ^a	0.47	0.38	0.47	0.38	0.47	0.38	0.47	0.38	0.47	0.38	0.47	0.38	0.47	0.38	0.47	0.38
Working Days	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	180.00	180.00	175.00	175.00	175.00	175.00
Average Hours per Day ^b	7.72	7.72	6.72	6.72	7.08	7.08	7.08	7.08	7.08	7.08	7.30	7.30	6.09	6.09	4.34	4.34
Emissions (lbs/day)	3.67	2.93	3.19	2.55	3.36	2.68	3.36	2.68	3.36	2.68	3.47	2.77	2.89	2.31	2.06	1.65
Emissions Reduction ^c	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%	70%
Adjusted Emissions (lbs/day)	2.57	2.05	2.23	1.78	2.35	1.88	2.35	1.88	2.35	1.88	2.43	1.94	2.024605	1.615635	1.44402	1.152328

Notes:

^a Equations from CalEEMod 2020.4.0 User's Guide, Appendix A for grading emissions.

^b Average Hours per Day calculated based on the anticipated construction equipment and duration used per day by phase.

^c Implementation of APM AQ-1 was assumed to reduce fugitive emissions by water application to stockpiles and covering stockpiles during windy conditions. The following reduction factor was taken from BAAQMD Permit Handbook.

Derivation of Paved Road Emission Factors

Parameter	PM ₁₀	PM _{2.5}
Average Weight ^a	2.4	2.4
k ^b	1	0.25
sL ^b	0.1	0.1
Emission Factor (g/mile) ^c	0.300	0.075

Notes:

^a Average Weight and sL taken as the default value from CalEEMod for Alameda County.

^b k taken from Table 13.2.1-1 of Section 13.2.1 of AP-42 (EPA, 2011).

^c Emission factor calculated using Equation 1 from Section 13.2.1 of AP-42 (EPA, 2011):

$$\text{Emission Factor (g/mile)} = k \text{ (g/mile)} \times [sL \text{ (g/m}^2\text{)}]^{0.91} \times [\text{Average Weight (tons)}]^{1.02}$$

Derivation of Unpaved Road Emission Factors

Parameter	PM ₁₀	PM _{2.5}
Mean Vehicle Weight ^a	4.3	4.3
Silt Content ^b	8.5	8.5
k ^c	1.5	0.15
a ^c	0.9	0.9
b ^c	0.45	0.45
P ^d	63	63
Emission Factor (g/mile) ^e	482.79	48.28
Reduction for Watering 2x Daily ^f	70%	70%
Reduction for speed limit of 25 mile per hour ^g	44%	44%
Controlled Emission Factor (g/mile)	81.11	8.11

Notes:

^a Mean vehicle weight assumes that heavy- and light-duty trucks weigh an average of 8,500 lbs (4.25 tons). <https://afdc.energy.gov/data/10380>.

^b Silt content taken from Table 13.2.2-1 of Section 13.2.2 of AP-42 (EPA, 2006) for a Construction Site, Scraper Route; this value is consistent with the CalEEMod defaults.

^c k, a, and b taken from Table 13.2.2-2 of Section 13.2.2 of AP-42 (EPA, 2006) for industrial roads.

^d P taken as the CalEEMod default for the climate region of Alameda County.

^e Emission factor calculated using Equations 1a and 2 from Section 13.2.2 of AP-42 (EPA, 2006):

$$\text{Emission Factor (g/mile)} = \{k \text{ (lbs/mile)} \times [\text{Silt Content (\%)} / 12]^a \times [\text{Mean Vehicle Weight (tons)} / 3]^b\} \times [(365-P) / 365] \times 453.6 \text{ (g/lb)}$$

^f Implementation of APM AQ-1 was assumed to reduce fugitive emissions by water application to stockpiles and covering stockpiles during windy conditions. The following reduction factor was taken from BAAQMD Permit Handbook.

^g Percent reduction taken from Table XI-D of *Mitigation Measures and Control Efficiencies* (SCAQMD, 2007) per APM AQ-1.

Energy Calculations

Off Road Equipment Type	Notes	#	HP	LF	Hr/Day	Start	End	Days	Working Days	Daily Mileage per vehicle	Fuel GPY	Average Fuel Economy (miles/gallon)	gallons per equipment day	Total Gallons Off-road	Total Gallons On-road
YEAR 1 (WMU 14 Perimeter Wall and Berm Construction)															
General Support Equipment															
Employee Trips		75							240	30		39	0	0	13846.15
F-150		4	300		1	3/1/2023	12/6/2023	280.0	240	50		26.2	0	0	1832.06
CUV102D utility vehicle		2	25	0.5	4	3/1/2023	12/6/2023	280.0	240	5		39	0	0	61.54
CT660 Tractor trailer	2015 or newer model year	1	475	1	2	3/1/2023	12/6/2023	280.0	240	15		6.5	0	0	553.85
Portable generator		1	18	0.74	4	3/1/2023	12/6/2023	280.0	240		1062.508		2.9109814	698.6355359	
Forklift (TH255C)	Tier 4	1	74	0.4	10	3/1/2023	12/6/2023	280.0	240		559.5506		1.533015314	367.9236753	
Kuma Odex Powerhouse	Tier 4	3	322	0.74	10	3/1/2023	12/6/2023	280.0	240		1941.606		5.319467439	3830.016556	
Hauling Trucks	32 one-way trips needed during Spring/Summer 2024 to remove 500 CY	1				3/1/2023	8/31/2024	549.0	124	20		6.5			381.54
Stormwater Pumps		4	5	0.74	10	3/1/2023	12/6/2023	280.0	240		266.087		0.729006551	699.8462887	
CT660 (Water Truck)	2015 or newer model year	1	475		10	3/1/2023	12/6/2023	280.0	240	20		6.5	0	0	738.46
Slurry Wall Construction															
Compressor 18		1	18	0.48	10	3/1/2023	9/27/2023	210.0	180		358.9946		0.983546742	177.0384136	
Excavator PC 200	Tier 4	1	110	0.38	10	3/1/2023	9/27/2023	210.0	180		1048.092		2.871484644	516.8672359	
Excavator PC 450	Tier 4	2	323	0.38	10	3/1/2023	9/27/2023	210.0	180		2553.943		6.997103075	2518.957107	
Compactor CAT 563		1	145	0.42	10	3/1/2023	9/27/2023	210.0	180		1362.45		3.732739609	671.8931297	
Haul Truck CT660	2015 or newer model year	2	475	0	10	3/1/2023	9/27/2023	210.0	180	25		6.5	0	0	1384.62
Perimeter Berm Construction															
140M AWD motor grader	Tier 4	1	183	0.41	4	9/27/2023	12/6/2023	70.0	50		1502.414		4.116201697	205.8100849	
Dozer CAT D6	Tier 4	1	165	0.43	10	9/27/2023	12/6/2023	70.0	60		2661.353		7.291379258	437.4827555	
Haul Truck CT660	Tier 4	5	475	0	10	9/27/2023	12/6/2023	70.0	60	40		6.5	0	0	1846.15
Excavator PC 200	Tier 4	1	110	0.38	10	3/1/2023	12/6/2023	280.0	240		1048.092		2.871484644	689.1563145	
Loader CAT 966	Tier 4	1	170	0.37	10	3/1/2023	12/6/2023	280.0	240		1530.04		4.191889666	1006.05352	
Compactor CAT 815	Tier 4	1	170	0.42	10	9/27/2023	12/6/2023	70.0	60		1362.45		3.732739609	223.9643766	
TOTAL													0	12043.64499	20644.37
YEAR 2 (WMUs 10/11 Excavation/Restoration)															
General Support Equipment															
Employee Trips		75							240	30		39	0	0	13846.15
F-150		4	300		1	3/1/2024	12/6/2024	280.0	240	50		26.2	0	0	1832.06
CUV102D utility vehicle		2	25	0.5	4	3/1/2024	12/6/2024	280.0	240	5		39	0	0	61.54
CT660 Tractor trailer	2015 or newer model year	1	475		2	3/1/2024	12/6/2024	280.0	240	15		6.5	0	0	553.85
Portable generator		1	18	0.74	4	3/1/2024	12/6/2024	280.0	240		1062.508		2.9109814	698.6355359	
Forklift (TH255C)	Tier 4	1	74	0.4	9	3/1/2024	12/6/2024	280.0	240		559.5506		1.533015314	367.9236753	
Kuma Odex Powerhouse	Tier 4	3	322	0.74	9	3/1/2024	12/6/2024	280.0	240		1941.606		5.319467439	3830.016556	
Stormwater/Dewatering Pumps		4	5	0.74	9	3/1/2024	12/6/2024	280.0	240		266.0874		0.729006551	699.8462887	
CT660 (Water Truck)	2015 or newer model year	1	475		9	3/1/2024	12/6/2024	280.0	240	20		6.5	0	0	738.46
WMU 10/11 Excavation/Backfill/Stabilization															
Excavator PC 400	Tier 4	1	305	0.38	9	3/1/2024	12/6/2024	280.0	240		2553.943		6.997103075	1679.304738	
Haul Truck CAT 730	Tier 4	2	329	0.38	9	3/1/2024	12/6/2024	280.0	240	30		6.5	0	0	2215.38
Haul Truck CT660	2015 or newer model year	5	475		9	3/1/2024	12/6/2024	280.0	240	60		6.5	0	0	11076.92
Dozer CAT D6	Tier 4	1	165	0.43	9	3/1/2024	12/6/2024	280.0	240		2661.353		7.291379258	1749.931022	
Excavator CAT 320	Tier 4	2	164	0.38	9	3/1/2024	12/6/2024	280.0	240		1726.578		4.730351629	2270.568782	
Loader CAT 966	Tier 4	1	170	0.37	9	3/1/2024	12/6/2024	280.0	240		1530.04		4.191889666	1006.05352	
Excavator PC 200	Tier 4	2	110	0.38	9	3/1/2024	12/6/2024	280.0	240		1048.092		2.871484644	1378.312629	
WMU 14 Placement															
140M AWD motor grader	Tier 4	1	183	0.41	4	3/1/2024	12/6/2024	280.0	240		1502.414		4.116201697	987.8884073	
Dozer CAT D6	Tier 4	1	165	0.43	4	3/1/2024	12/6/2024	280.0	240		1362.45		3.732739609	895.8575062	
Compactor CAT 563		1	145	0.42	9	3/1/2024	12/6/2024	280.0	240		1362.45		3.732739609	895.8575062	
TOTAL													0	16460.19617	30324.37
YEAR 3 (WMU 31 Excavation/Restoration - Part 1)															
General Support Equipment															
Employee Trips		75							240	30		39	0	0	13846.15
F-150		4	300		1	3/1/2025	12/6/2025	280.0	240	50		26.2	0	0	1832.06
CUV102D utility vehicle		2	25	0.5	3	3/1/2025	12/6/2025	280.0	240	5		39	0	0	61.54
CT660 Tractor trailer	2015 or newer model year	1	475		2	3/1/2025	12/6/2025	280.0	240	15		6.5	0	0	553.85
Forklift (TH255C)	Tier 4	1	74	0.4	4	3/1/2025	12/6/2025	280.0	240		559.5506		1.533015314	367.9236753	

Kuma Odex Powerhouse	Tier 4	5	322	0.74	8.5	3/1/2025	12/6/2025	280.0	240		1941.606		5.319467439	6383.360927	
Stormwater/Dewatering Pumps		4	5	0.74	8.5	3/1/2025	12/6/2025	280.0	240		266.0874		0.729006551	699.8462887	
CT660 (Water Truck)	2015 or newer model year	1	475	0	8.5	3/1/2025	12/6/2025	280.0	240	20		6.5	0	0	738.46
WMU 31 Excavation/Backfill/Stabilization															
Excavator PC 400	Tier 4	1	305	0.38	8.5	3/1/2025	12/6/2025	280.0	240		2553.943		6.997103075	1679.304738	
Haul Truck CT660 (Dirty)	2015 or newer model year	5	475		8.5	3/1/2025	12/6/2025	280.0	240	30		6.5	0	0	5538.46
Haul Truck CT660 (Clean)	2015 or newer model year	5	475		8.5	3/1/2025	12/6/2025	280.0	240	60		6.5	0	0	11076.92
Dozer CAT D6	Tier 4	1	165	0.43	8.5	3/1/2025	12/6/2025	280.0	240		1362.45		3.732739609	895.8575062	
Excavator CAT 320	Tier 4	2	164	0.38	8.5	3/1/2025	12/6/2025	280.0	240		1726.578		4.730351629	2270.568782	
Loader CAT 966	Tier 4	1	170	0.37	8.5	3/1/2025	12/6/2025	280.0	240		1530.04		4.191889666	1006.05352	
Excavator PC 200	Tier 4	2	110	0.38	8.5	3/1/2025	12/6/2025	280.0	240		1008.982		2.764333743	1326.880196	
WMU 14 Placement															
140M AWD motor grader	Tier 4	1	183	0.41	4	3/1/2025	12/6/2025	280.0	240		1502.414		4.116201697	987.8884073	
Dozer CAT D6	Tier 4	1	165	0.43	4	3/1/2025	12/6/2025	280.0	240		1362.45		3.732739609	895.8575062	
Compactor CAT 563		1	145	0.42	8.5	3/1/2025	12/6/2025	280.0	240		1362.45		3.732739609	895.8575062	
TOTAL													0	17409.39905	33647.44568
YEAR 4 (WMU 31 Excavation/Restoration - Part 2)															
General Support Equipment															
Employee Trips		75							240	30			39	0	13846.15
F-150		4	300		1	3/1/2026	12/6/2026	280.0	240	50		26.2	0	0	1832.06
CUV102D utility vehicle		2	25	0.5	3	3/1/2026	12/6/2026	280.0	240	5		39	0	0	61.54
CT660 Tractor trailer	2015 or newer model year	1	475		2	3/1/2026	12/6/2026	280.0	240	15		6.5	0	0	553.85
Portable generator		0	18	0.74	3	3/1/2026	12/6/2026	280.0	240		1062.508		2.9109814	0	
Forklift (TH255C)	Tier 4	1	74	0.4	4	3/1/2026	12/6/2026	280.0	240		559.5506		1.533015314	367.9236753	
Kuma Odex Powerhouse	Tier 4	5	322	0.74	8.5	3/1/2026	12/6/2026	280.0	240		1941.606		5.319467439	6383.360927	
Stormwater/Dewatering Pumps		4	5	0.74	8.5	3/1/2026	12/6/2026	280.0	240		266.0874		0.729006551	699.8462887	
CT660 (Water Truck)	2015 or newer model year	1	475		8.5	3/1/2026	12/6/2026	280.0	240	20		6.5	0	0	738.46
WMU 31 Excavation/Backfill/Stabilization															
Excavator PC 400	Tier 4	1	305	0.38	8.5	3/1/2026	12/6/2026	280.0	240		2553.943		6.997103075	1679.304738	
Haul Truck CT660 (Dirty)	2015 or newer model year	5	475		8.5	3/1/2026	12/6/2026	280.0	240	30		6.5	0	0	5538.46
Haul Truck CT660 (Clean)	2015 or newer model year	5	475		8.5	3/1/2026	12/6/2026	280.0	240	60		6.5	0	0	11076.92
Dozer CAT D6	Tier 4	1	165	0.43	8.5	3/1/2026	12/6/2026	280.0	240		1362.45		3.732739609	895.8575062	
Excavator CAT 320	Tier 4	2	164	0.38	8.5	3/1/2026	12/6/2026	280.0	240		1726.578		4.730351629	2270.568782	
Loader CAT 966	Tier 4	1	170	0.37	8.5	3/1/2026	12/6/2026	280.0	240		1530.04		4.191889666	1006.05352	
Excavator PC 200	Tier 4	2	110	0.38	8.5	3/1/2026	12/6/2026	280.0	240		1008.982		2.764333743	1326.880196	
WMU 14 Placement															
140M AWD motor grader	Tier 4	1	183	0.41	4	3/1/2026	12/6/2026	280.0	240		1502.414		4.116201697	987.8884073	
Dozer CAT D6	Tier 4	1	165	0.43	4	3/1/2026	12/6/2026	280.0	240		1362.45		3.732739609	895.8575062	
Compactor CAT 563		1	145	0.42	8.5	3/1/2026	12/6/2026	280.0	240		1362.45		3.732739609	895.8575062	
TOTAL													0	17409.39905	33647.44568
YEAR 5 (WMU 31 Excavation/Restoration - Part 3)															
General Support Equipment															
Employee Trips		75							240	30			39	0	13846.15
F-150		4	300		1	3/1/2027	12/6/2027	280.0	240	50		26.2	0	0	1832.06
CUV102D utility vehicle		2	25	0.5	3	3/1/2027	12/6/2027	280.0	240	5		39	0	0	61.54
CT660 Tractor trailer	2015 or newer model year	1	475		2	3/1/2027	12/6/2027	280.0	240	15		6.5	0	0	553.85
Portable generator		0	18	0.74	3	3/1/2027	12/6/2027	280.0	240		1062.508		2.9109814	0	
Forklift (TH255C)	Tier 4	1	74	0.4	4	3/1/2027	12/6/2027	280.0	240		559.5506		1.533015314	367.9236753	
Kuma Odex Powerhouse	Tier 4	5	322	0.74	8.5	3/1/2027	12/6/2027	280.0	240		1941.606		5.319467439	6383.360927	
Stormwater/Dewatering Pumps		4	5	0.74	8.5	3/1/2027	12/6/2027	280.0	240		266.0874		0.729006551	699.8462887	
CT660 (Water Truck)	2015 or newer model year	1	475		8.5	3/1/2027	12/6/2027	280.0	240	20		6.5	0	0	738.46
WMU 31 Excavation/Backfill/Stabilization															
Excavator PC 400	Tier 4	1	305	0.38	8.5	3/1/2027	12/6/2027	280.0	240		2553.943		6.997103075	1679.304738	
Haul Truck CT660 (Dirty)	2015 or newer model year	5	475		8.5	3/1/2027	12/6/2027	280.0	240	30		6.5	0	0	5538.46
Haul Truck CT660 (Clean)	2015 or newer model year	5	475		8.5	3/1/2027	12/6/2027	280.0	240	60		6.5	0	0	11076.92
Dozer CAT D6	Tier 4	1	165	0.43	8.5	3/1/2027	12/6/2027	280.0	240		1362.45		3.732739609	895.8575062	
Excavator CAT 320	Tier 4	2	164	0.38	8.5	3/1/2027	12/6/2027	280.0	240		1726.578		4.730351629	2270.568782	
Loader CAT 966	Tier 4	1	170	0.37	8.5	3/1/2027	12/6/2027	280.0	240		1530.04		4.191889666	1006.05352	
Excavator PC 200	Tier 4	2	110	0.38	8.5	3/1/2027	12/6/2027	280.0	240		1008.982		2.764333743	1326.880196	
WMU 14 Placement															
140M AWD motor grader	Tier 4	1	183	0.41	4	3/1/2027	12/6/2027	280.0	240		1502.414		4.116201697	987.8884073	
Dozer CAT D6	Tier 4	1	165	0.43	4	3/1/2027	12/6/2027	280.0	240		1362.45		3.732739609	895.8575062	
Compactor CAT 563		1	145	0.42	8.5	3/1/2027	12/6/2027	280.0	240		1362.45		3.732739609	895.8575062	
TOTAL													0	17409.39905	33647.44568

YEAR 6 (WMU 14 Cover Construction)																
General Support Equipment																
Employee Trips		75							180	30			39	0	0	10384.62
F-150		4	300		1	3/1/2028	9/27/2028	210.0	180	50			26.2	0	0	1374.05
CUV102D utility vehicle		2	25	0.5	4	3/1/2028	9/27/2028	210.0	180	5			39	0	0	46.15
CT660 Tractor trailer	2015 or newer model year	1	475		2	3/1/2028	9/27/2028	210.0	180	15			6.5	0	0	415.38
Portable generator		1	18	0.74	4	3/1/2028	9/27/2028	210.0	180		1062.508			2.9109814	523.9766519	
Forklift (TH255C)	Tier 4	1	74	0.4	10	3/1/2028	9/27/2028	210.0	180		559.5506			1.533015314	275.9427565	
Kuma Odex Powerhouse	Tier 4	1	322	0.74	10	3/1/2028	9/27/2028	210.0	180		1941.606			5.319467439	957.5041391	
CT660 (Water Truck)	2015 or newer model year	1	475		10	3/1/2028	9/27/2028	210.0	180	20	266.0874		6.5	0.729006551	131.2211791	553.85
Cover Construction																
Excavator PC 200	Tier 4	1	110	0.38	10	3/1/2028	9/27/2028	210.0	180		1008.982			2.764333743	497.5800737	
Excavator PC 400	Tier 4	1	305	0.38	10	3/1/2028	9/27/2028	210.0	180		2553.943			6.997103075	1259.478553	
Compactor CAT 563		1	145	0.42	10	3/1/2028	9/27/2028	210.0	180		1362.45			3.732739609	671.8931297	
Compactor CAT 815	Tier 4	1	170	0.42	10	3/1/2028	9/27/2028	210.0	180		1362.45			3.732739609	671.8931297	
Dozer CAT D6	Tier 4	1	165	0.43	10	3/1/2028	9/27/2028	210.0	180		1362.45			3.732739609	671.8931297	
160M3 AWD motor grader	Tier 4	1	213	0.41	10	3/1/2028	9/27/2028	210.0	180		1502.414			4.116201697	740.9163055	
Haul Truck CT660	2015 or newer model year	5	475		10	3/1/2028	9/27/2028	210.0	180	50			6.5	0	0	6923.08
Loader CAT 966	Tier 4	1	170	0.37	10	3/1/2028	9/27/2028	210.0	180		1530.04			4.191889666	754.5401398	
TOTAL															7156.839188	19697.12
YEAR 7 (WMU 32 Closure)																
General Support Equipment																
Employee Trips		75							175	30			39			10096.15
F-150		4	300		1	3/24/2029	11/23/2023	-1948	175	15			26.2			400.76
Small power house	Tier 4	3	322	0.74	10	3/24/2029	11/23/2023	-1948	175		1941.606			5.319467439	2792.720406	
Portable generator		8	18	0.74	8	3/24/2029	11/23/2023	-1948	175		1062.508			2.9109814	4075.37396	
Forklift (TH255C)	Tier 4	1	74	0.4	2	3/24/2029	11/23/2023	-1948	175		559.5506			1.533015314	268.2776799	
CT660 (Water Truck)	2015 or newer model year	1	475	1	6	3/24/2029	11/23/2023	-1948	175	20			6.5	0	0	538.46
450F backhoe	Tier 4	1	128	0.37	4	3/24/2029	11/23/2023	-1948	175		1530.04			4.191889666	733.5806915	
CUV102D utility vehicle		1	25	0.5	4	3/24/2029	11/23/2023	-1948	175	5			39	0	0	22.44
950M wheel loader	Tier 4	2	250	0.37	6	3/24/2029	11/23/2023	-1948	175		2233.909			6.120298549	2142.104492	
Hauling Trucks	907 one-way trips needed during Fall 2023 to remove 14,500 CY	30				9/1/2029	12/1/2023	-2101	61	20			6.5	0	0	5630.77
CT660 Tractor trailer (delivering and picking up equipment)	2015 or newer model year	1	475		2	3/24/2029	11/23/2023	-1948	175	11			6.5	0	0	296.15
Site Preparation																
Dump Trucks		1	402	0.38	8	7/1/2029	7/22/2029	21	15	500			6.5			1153.85
Drill Rig (Well Abandonment)		10	475	0.5	4	7/1/2029	9/29/2029	90	60		1773.029			4.857612532	2914.567519	
D4 bulldozer	Tier 4	2	48	0.43	6	3/24/2029	6/22/2029	90	60		900.531			2.467208086	296.0649703	
973D Track loader	Tier 4	1	210	0.37	6	3/24/2029	6/22/2029	90	60		2233.909			6.120298549	367.2179129	
Forklift (TH255C)	Tier 4	1	74	0.4	8	3/24/2029	6/22/2029	90	60		319.3538			0.874942006	52.49652036	
450F Backhoes	Tier 4	1	128	0.37	8	3/24/2029	6/22/2029	90	60		1008.982			2.764333743	165.8600246	
String Trimmers		12	1.4	0.42	8	3/24/2029	6/22/2029	90	60		332.4203			0.910740559	655.7332026	
Preparation of Foundation Layers.																
CT660 Tractor trailer (delivering materials 30cy trailer)	2015 or newer model year	5	475		4	6/23/2029	8/22/2029	60	40	500			6.5	0	0	15384.62
D4 bulldozer	Tier 4	2	48	0.43	8	6/23/2029	8/22/2029	60	40		900.531			2.467208086	197.3766469	
2-inch trash pump (collect and pump surface/groundwater to sewer)		2	4	0.74	8	6/23/2029	8/7/2029	45	30		266.087			0.729006551	43.74039304	
Cap Construction																
Portable generator (Liner welding)	8 accounted for in general support, modeled 5 more for this construction	5	18	0.74	8	10/1/2029	12/30/2029	90	60		205.2257			0.56226208	168.6786241	
Small portable generators for hand tools		12	6	0.74	8	10/1/2029	12/30/2029	90	60		205.2257			0.56226208	404.8286978	
Generators (for office trailers)	Tier 4	3	322	0.74	8	10/1/2029	12/30/2029	90	60		791.3667			2.168127854	390.2630137	
Boom Trucks (10 wheel for setting columns and beams)		3	280	0.38	4	10/1/2029		90	60		5326.02			14.59183653	2626.530575	
Telehandlers		3	63	0.31	8	10/1/2029	12/30/2029	90	60		559.5506			1.533015314	275.9427565	
Side by Sides		6	25	0.5	8	10/1/2029	12/30/2029	90	60	5			39	0	0	46.15
Walk Behind Trencher		1	78	0.5	8	10/1/2029	10/8/2029	7	5		493.8354			1.352973633	6.764868167	
Tracked Bobcat		3	55	0.42	8	10/1/2029	12/30/2029	90	60		791.3667			2.168127854	390.2630137	
TOTAL															19388.21215	32415.51
YEAR 8 (WMU 32 Closure)																
General Support Equipment																
Employee Trips		75							175	30			39			10096.15
F-150		4	300		1	3/24/2030	11/23/2023	-2313	175	15			26.2			400.76

Small power house	Tier 4	3	322	0.74	10	3/24/2030	11/23/2023	-2313	175		1941.606		5.319467439	2792.720406	
Portable generator		8	18	0.74	8	3/24/2030	11/23/2023	-2313	175		1062.508		2.9109814	4075.37396	
Forklift (TH255C)	Tier 4	1	74	0.4	2	3/24/2030	11/23/2023	-2313	175		559.5506		1.533015314	268.2776799	
CT660 (Water Truck)	2015 or newer model year	1	475	1	6	3/24/2030	11/23/2023	-2313	175	20		6.5	0	0	538.46
450F backhoe	Tier 4	1	128	0.37	4	3/24/2030	11/23/2023	-2313	175		1530.04		4.191889666	733.5806915	
CUV102D utility vehicle		1	25	0.5	4	3/24/2030	11/23/2023	-2313	175	5		39	0	0	22.44
950M wheel loader	Tier 4	2	250	0.37	6	3/24/2030	11/23/2023	-2313	175		2233.909		6.120298549	2142.104492	
Hauling Trucks	907 one-way trips needed during Fall 2023 to remove 14,500 CY	30				9/1/2030	12/1/2023	-2466	61	20		6.5			5630.77
CT660 Tractor trailer (delivering and picking up equipment)	2015 or newer model year	1	475		2	3/24/2030	11/23/2023	-2313	175	11		6.5	0	0	296.15
Cap Construction															
Portable generator (Liner welding)	8 accounted for in general support, modeled 5 more for this construction	5	18	0.74	8	10/1/2030	12/30/2030	90	60		205.2257		0.56226208	168.6786241	
Small portable generators for hand tools		12	6	0.74	8	10/1/2030		90	60		205.2257		0.56226208	404.8286978	
Generators (for office trailers)	Tier 4	3	322	0.74	8	10/1/2030	12/30/2030	90	60		797.45		2.184794521	393.2630137	
Boom Trucks (10 wheel for setting columns and beams)		3	280	0.38	4	10/1/2030		90	60		5326.02		14.59183653	2626.530575	
Telehandlers		3	63	0.31	8	10/1/2030	12/30/2030	90	60		559.5506		1.533015314	275.9427565	
Side by Sides		6	25	0.5	8	10/1/2030	12/30/2030	90	60	5		39	0	0	46.15
Walk Behind Trencher		1	78	0.5	8	10/1/2030	10/8/2030	7	5		493.8354		1.352973633	6.764868167	
Tracked Bobcat		3	55	0.42	8	10/1/2030	12/30/2030	90	60		797.45		2.184794521	393.2630137	
Post Closure Monitoring and Maintenance															
F-150		1	300		3	4/15/2030	4/29/2030	14	10	11		26.2	0	0	4.20
CT660 Drill Rig (Well Installation)		1	475	0.5	8	4/15/2030	4/29/2030	14	10		3511.034		9.619272446	96.19272446	
F-150 (Post closure sampling and Monitoring)		1	300		4	yearly	yearly	1	1	11		26.2	0	0	0.42
2-inch trash pump (Post closure sampling and Monitoring)		1	4	0.74	4	yearly	yearly	1	1		266.087		0.729006551	0.729006551	
TOTAL													0	14851.13798	22573.97

TOTAL 122128.2276 226597.68 348726

Notes:

Employee Trip Fuel Efficiency based on 2019 CAFÉ Standards for passenger cars: <https://www.bts.gov/content/average-fuel-efficiency-us-light-duty-vehicles>
Truck trips assumed to be 6.5 miles/gallon: <https://afdc.energy.gov/data/10310>
Annual fuel consumption for offroad consumption equipment from OFFROAD 2017 for 2023 Contra Costa County, split by horse power bin: <https://www.arb.ca.gov/orion/>

20644
30324
33647
33647
33647
19697
32415
22574
226595

The following conversion factors were used to estimate emissions:

1 lb = 453.6 g
1 metric ton = 2,204.62 lbs
1 ton = 2,000 lbs
1 metric ton = 0.907 tons

Global Warming Potential

CO2 1
CH4 25
N2O 298

Appendix C
Special Status Species Summary, prepared by
WRA, 2021

SPECIAL STATUS SPECIES SUMMARY

WMUs 10/11/14, 31, 32 Closure Project
Marathon Martinez Refinery
Martinez, Contra Costa County, California

Prepared for:

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ACRONYMS AND ABBREVIATIONS

ART	Avon Remediation Team
CBR	California Black Rail
CESA	California Endangered Species Act
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRR	California Ridgway's rail
CWC	Clean Water Canal
FESA	Federal Endangered Species Act
PEWA	Point Edith Wildlife Area
Refinery	Marathon Martinez Refinery, formerly Tesoro Golden Eagle Refinery, formerly Tesoro Martinez Refinery, formerly Andeavor Martinez Refinery
SMHM	Salt Marsh Harvest Mouse
USFWS	United States Fish and Wildlife Service
WMU	Waste Management Unit
WRA	WRA, Inc.

DEFINITION OF TERMS

Project - Proposed activities undertaken for regulatory closure of inactive WMUs 10/11/14, 31, and 32.

Project Area - Locations where the Project will take place. The Project Area corresponds to the limit of ground disturbance within and adjacent to the three WMUs.

1.0 INTRODUCTION

The objective of this document is to discuss the potential of special status species to occur in relation to the WMU 10/11/14, 31, and 32 Closure Project and summarize the species surveys conducted in and around the Tesoro (now Marathon) Martinez Refinery (Refinery) related to those species.

2.0 METHODS

This document summarizes previous surveys and reports conducted by WRA on behalf of the Avon Remediation Team (ART).

Special status species summarized include those plants and wildlife species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the Federal Endangered Species Act (FESA) or the California Endangered Species Act (CESA). These Acts afford protection from “take” of both listed species and those proposed for listing. Under the FESA, “take” of a species includes activities that harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempts to engage in any such conduct. This may include significant habitat modification or degradation if it kills or injures wildlife by significantly impairing essential behavioral patterns including breeding, feeding, or sheltering. In contrast, “take” of a species under the CESA would occur if the species is hunted, pursued, killed, or captured, or if any other actions are undertaken that may result in adverse impacts when attempting to take individuals of a listed species.

Plant species on the California Native Plant Society (CNPS) Lists 1 and 2 are also considered special status plant species. CNPS List 3 plants are not protected under federal or state regulations, but are included in this analysis for completeness. Plant species are categorized by CNPS according to degree of concern:

- CNPS List 1A – Presumed extinct in California
- CNPS List 1B – Rare, threatened or endangered in California and elsewhere
- CNPS List 2 – Rare, threatened or endangered in California, but more common elsewhere
- CNPS List 3 – Plants about which more information is needed (a review list)
- CNPS List 4 – Plants of limited distribution (a watch list)

2.1 Literature Review

Potential occurrences of special status species in the Project Area were evaluated by first determining which special status species occur in the greater vicinity of the Project Area through a literature and database search. Database searches for known occurrences of special status species focused on the Vine Hill 7.5 minute USGS quadrangle and the eight surrounding USGS quadrangles. The following sources were reviewed to identify which special status plant and wildlife species have been documented to occur in the greater vicinity of the Study Area:

- California Natural Diversity Database records (CNDDDB) (CDFG 2008, 2009, 2010, 2011) (CDFW 2016, 2017, 2021)
- USFWS Information for Planning and Conservation Species Lists (USFWS 2021)
- CNPS Electronic Inventory records (CNPS 2010, 2011, 2016, 2021)

- CDFG publication “California’s Wildlife, Volumes I-III” (Zeiner et al. 1990)
- CDFG publication “Amphibians and Reptile Species of Special Concern in California” (Jennings and Hayes 1994)
- A Field Guide to Western Reptiles and Amphibians (Stebbins 2003)
- Fairy Shrimps of California’s Puddles, Pools and Playas (Eriksen and Belk 1999)

2.2 Summary of Surveys Conducted

WMU 10/11/14

- A preliminary site visit was conducted on August 15, 2007, to identify suitable habitats for species identified in the literature review as occurring in the greater vicinity (WRA 2009a).
- Floristic, protocol-level rare plant surveys were performed as part of BRA in 2007 (WRA 2009a)
- California Ridgeway’s Rail, (formerly California Clapper Rail) Surveys in 2008, 2009, 2014, 2015, 2016, and 2017 (WRA 2008b, 2009d, 2014, 2015b, 2016b, 2017b)
- A floristic, protocol-level rare plant surveys were conducted on September 21 and 23, 2011 (WRA 2011a).
- A 2014 focused rare plant survey in tidally influenced areas in Project Areas north of WMUs 10/11/14 (WRA 2015a).

WMU 31

- A preliminary site assessment was conducted in 2007, to identify suitable habitats for species identified in the literature review as occurring in the greater vicinity of the Project Area (WRA 2009b).
- Floristic, protocol-level rare plant surveys as part of BRA (WRA 2009b)
- California Ridgeway’s Rail, (formerly California Clapper Rail) Surveys in 2008, 2009, 2011, 2014, 2015, 2016, and 2017 (WRA 2008c, 2009b, 2011b, 2014, 2015b, 2016b, and 2017b).
- Floristic, protocol-level rare plant surveys were conducted on September 21 and 23, 2011 (WRA 2011a).
- Biological monitoring of data gap closure studies was conducted in 2011.

WMU 32

- A preliminary site visit was conducted on August 10, 2007 to identify suitable habitats for species identified in the literature review as occurring in the immediate vicinity (WRA 2009c).
- Floristic, protocol-level rare plant surveys as part of BRA (WRA 2009c).
- California Ridgeway’s Rail, (formerly California Clapper Rail) Surveys in 2008, 2009 and 2012 through 2017 (WRA 2008d, 2009f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b).
- A floristic, protocol-level rare plant survey was conducted in 2011 (WRA 2011a).
- A 2014 focused rare plant survey in tidally influenced areas southeast of WMU 32 Project Areas (WRA 2015a).
- Biological monitoring of ongoing closure studies was conducted in 2010, 2015, 2016, and 2018 (Appendix C).

2.3 Special Status Species Potential Determination

Special status species potential is determined on a by unit basis and will vary from Project Area to Project Area. The potential for special status species to occur in the Project Area or immediate vicinity was then evaluated according to the following criteria:

- Present. Species is observed on the site or has been recorded (i.e. CNDDDB, other reports) on the site recently.
- High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.
- Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.
- Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.
- No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (foraging, breeding, cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

3.0 SPECIAL-STATUS SPECIES WITH POTENTIAL

3.1 Special Status Plants

Protocol-level special status rare plant surveys have been conducted within the Project Area (see section 2.1.1). All species potentials are determined based off of previous site visits observations and surveys, and a professional understanding of species habitat.

3.1.1 Summary of Special Status Plants

WMUs 10/11/14

- Crownscale, *Atriplex coronata* var. *coronata*: Moderate potential
- Congdon's tarplant; *Centromadia parryi* ssp. *congdonii*: High potential
- Pappose tarplant; *Centromadia parryi* ssp. *parryi*: Moderate potential
- Parry's rough tarplant; *Centromadia parryi* ssp. *rudis*: Moderate potential
- Soft bird's beak; *Chloropyron molle* ssp. *molle*: Moderate potential
- Bolander's water-hemlock; *Cicuta maculata* var. *bolanderi*: High potential
- Suisun thistle; *Cirsium hydrophilium* var. *hydrophilium*: Moderate potential
- San Joaquin spearscale; *Extriplex joaquinana*: Moderate potential
- Suisun marsh aster; *Symphotrichum lentum*: High potential

Of these special status plant species, none have been observed during routine site visits or protocol-level surveys.

WMU 31

- Crownscale, *Atriplex coronata* var. *coronata*: Moderate potential
- Congdon's tarplant; *Centromadia parryi* ssp. *congdonii*: High potential
- Pappose tarplant; *Centromadia parryi* ssp. *parryi*: Moderate potential
- Parry's rough tarplant; *Centromadia parryi* ssp. *rudis*: Moderate potential
- Bolander's water-hemlock; *Cicuta maculata* var. *bolanderi*: High potential
- San Joaquin spearscale; *Extriplex joaquinana*: Moderate potential
- Delta tule pea; *Lathyrus jepsonii* var. *jepsonii*: High potential
- Suisun marsh aster; *Symphyotrichum lentum*: High potential

Of these special status plant species, none have been observed during routine site visits or protocol-level surveys.

WMU 32

- Crownscale, *Atriplex coronata* var. *coronata*: Moderate potential
- Congdon's tarplant; *Centromadia parryi* ssp. *congdonii*: High potential
- Pappose tarplant; *Centromadia parryi* ssp. *parryi*: Moderate potential
- Parry's rough tarplant; *Centromadia parryi* ssp. *rudis*: Moderate potential
- San Joaquin spearscale; *Extriplex joaquinana*: Moderate potential
- Suisun marsh aster; *Symphyotrichum lentum*: High potential

Of these special status plant species, none have been observed during routine site visits or protocol-level surveys.

3.1.2 Potential Special Status Plants

Alkali milk-vetch (*Astragalus tener* var. *tener*). CNPS List 1B. Alkali milk-vetch is an annual herb in the Fabaceae family that typically occurs within alkali playa, adobe clay valley and foothill grassland, and vernal pool habitats, and is most often in association with low ground, flats, and flooded lands underlain by highly alkaline (8 to 9 pH) clay substrate at elevations ranging from sea level to 300 feet (CDFW 2021).

Potential to Occur in WMUs

Alkali milk-vetch is unlikely to occur in WMUs 10/11/14, 31, or 32 due to lack of natural, intact vernal pool complexes or seed sources from the immediate vicinity and was not observed during rare plant surveys conducted in August 2007 (WRA 2009a-c) or September 2011 (WRA 2013a).

Heartscale (*Atriplex cordulata* var. *cordulata*). CNPS List 1B. Heartscale is an annual herb in the Chenopodiaceae family that occurs in chenopod scrub, meadows and seeps, and sandy/saline or alkaline valley and foothill grassland at elevations ranging from sea level to 1,840 feet. It typically grows in alkaline flats and scalds in the Central Valley and on sandy soils.

Potential to Occur in WMUs

Heartscale is unlikely to occur in WMU 10/11/14, 31, or 32 due to the lack of highly alkali chenopod scrub, meadow, mesic grassland, and intact vernal pool complex habitats and was not observed during rare plant surveys conducted in August 2007 (WRA 2009a-c) or September 2011 (WRA 2013a).

Crownscale, *Atriplex coronata* var. *coronata*. CNPS List 4.2. Crownscale is an annual herb in the Chenopodiaceae family that occurs in chenopod scrub, valley and foothill grassland, and vernal pools at elevations ranging from sea level to 1,940 feet (CDFW 2021). It typically grows in fine, alkaline, and clay soils.

Potential to Occur in WMUs

WMU 10/11/14

Crownscale has moderate potential to occur in seasonal wetlands found in WMU 10/11/14. However, crownscale is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in WMU 10/11/14 (CDFW 2021).

WMU 31

Crownscale has moderate potential to occur in seasonal wetlands found in WMU 31. However, crownscale is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in WMU 31 (WRA 2009b).

WMU 32

Crownscale has moderate potential to occur in seasonal wetlands found in WMU 32. However, crownscale is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in WMU 31 (WRA 2009c).

Brittlescale, *Atriplex depressa*. CNPS List 1B. Brittlescale is an annual herb in the Chenopodiaceae family that occurs in chenopod scrub, meadows and seeps, playas, grassland, and vernal pools at elevations ranging from sea level to 1,050 feet (CDFW 2021). It is typically found in alkali scalds or clay in meadows or annual grassland and is rarely associated with riparian habitat, marshes, or vernal pools.

Potential to Occur in WMUs

Although WMUs 10/11/14, 31, and 32 contain seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, mesic grassland, and intact vernal pool complex habitats that are lacking in these units (CDFW 2017). Brittlescale is unlikely to occur in these units and was not observed during rare plant surveys conducted in August 2007 (WRA 2009a-c) or September 2011 (WRA 2011a).

Brewer's calandrinia; *Calandrinia breweri*. CNPS List 4.2. Brewer's calandrinia is an annual herb in the Montiaceae family that occurs in chaparral, coastal scrub, and disturbed sites and

burns at elevations ranging from 30 feet to 400 feet. It typically is found in sandy or loamy soils and disturbed or burned sites.

Potential to Occur in WMUs

WMU 10/11/14, 31, and 32 do not contain suitable scrub, chaparral, or recently burned areas that would be suitable habitat for Brewer's calandrinia (WRA 2009a-c).

Johnny-nip; *Castilleja ambigua* var. *ambigua*. CNPS List 4.2. Johnny-nip is an annual herb in the Orobanchaceae family that occurs in coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grasslands, and the margins of vernal pools at elevations ranging from sea level to 1,430 feet.

Potential to Occur in WMUs

WMU 10/11/14

WMU 10/11/14 has no potential to support Johnny-nip. Although WMU 10/11/14 does contain elements of salt marsh vegetation and is located adjacent to muted tidal channels, this species is commonly seen in freshwater seasonal marsh, intact vernal pool complex, or naturally occurring grasslands. Therefore, WMU 10/11/14 does not contain the necessary habitat to support this species (WRA 2009a).

WMU 31

WMU 31 has no potential to support Johnny-nip, as it does not contain scrub, prairie, freshwater seasonal marsh, intact vernal pool complex, or naturally occurring grassland habitats necessary to support this species (WRA 2009b).

WMU 32

WMU 32 has no potential to support Johnny-nip, as it does not contain scrub, prairie, freshwater seasonal marsh, intact vernal pool complex, or naturally occurring grassland habitats necessary to support this species (WRA 2009c).

Congdon's tarplant; *Centromadia parryi* ssp. *congdonii*. CNPS List 1B. Congdon's tarplant is an annual herb in the Asteraceae family that occurs in chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, vernal mesic valley and foothill grassland at elevations ranging from sea level to 1,380 feet. It typically is found growing on alkaline soils sometimes described as heavy white clay.

Potential to Occur in WMUs

Congdon's tarplant has a high potential to occur in all WMUs due to the presence of alkali grassland and margins of brackish marsh habitat, this species' high tolerance for invasive species

competition, and the presence of associated species (WRA 2011a). The nearest and most recent documented occurrence in the greater vicinity is from August 2005 at McNabney Marsh, less than two miles west of the WMUs. This species was not observed in the WMUs during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Pappose tarplant; *Centromadia parryi* ssp. *parryi*. CNPS List 1B. Pappose tarplant is an annual herb in the Asteraceae family that occurs in chaparral, coastal prairie, meadows and seeps, coastal salt marshes and swamps, vernal mesic valley and foothill grassland at elevations ranging from sea level to 1,380 feet. Observed associated species include bristly oxtongue (*Helminthotheca echioides*), wild radish (*Raphanus sativus*), foxtail fescue (*Festuca myuros*), willow leaf dock (*Rumex salicifolius*), toad rush (*Juncus bufonius*), Italian rye grass, Mediterranean barley (*Hordeum marinum*), salt grass, alkali heath, perennial pepperweed (*Lepidium latifolium*), yellow star thistle (*Centaurea solstitialis*), alkali mallow (*Malvella leprosa*), and alkali weed. It is typically found in vernal mesic, often alkaline sites.

The nearest documented occurrence in the greater vicinity is from September 1998 along Interstate 680, Solano County, approximately eight miles north of the Project Areas (CDFG 2011). The most recent documented occurrence is from November 2007 near Suisun City, approximately 14 miles north of the Project Areas (WRA 2013a).

Potential to Occur in WMUs

Although WMUS 10/11/14, 31, and 32 do not contain naturally-occurring grassland habitat, Pappose tarplant is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of these units (CDFW 2021). This species has a moderate potential to occur in all three WMUs due to the presence of potentially suitable habitat and associated species. However, this species is not known from the south side of Suisun Bay (WRA 2013a). This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Parry's rough tarplant; *Centromadia parryi* ssp. *rudis*. CNPS List 1B. Parry's rough tarplant is an annual herb in the Asteraceae family that occurs in valley and foothill grassland; alkaline vernal pools; vernal mesic seeps; and sometimes roadsides at elevations ranging from sea level to 330 feet (CDFW 2021).

Potential to Occur in WMUs

Although WMUS 10/11/14, 31, and 32 do not contain naturally-occurring grassland habitat, Pappose tarplant is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of these units. This species has a moderate potential to occur in all three WMUs due to the presence of potentially suitable habitat and associated species. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Soft bird's beak; *Chloropyron molle* ssp. *molle*. Federal Endangered; State Endangered; CNPS List 1B. Soft bird's beak is an annual herb in the Orobanchaceae family. It typically occurs on the edge of pannes and in low growing (0.5 to 1.5 feet) marsh vegetation in coastal salt marsh

and coastal brackish marsh at elevations ranging from 0 to 10 feet (CDFG 2011, CNPS 2011). Observed associated species include pickleweed (*Salicornia virginica*), salt grass (*Distichlis spicata*), fleshy jaumea (*Jaumea carnosa*), alkali heath, fat hen (*Atriplex patula*), Italian rye grass, salt marsh dodder (*Cuscuta salina*), marsh fleabane (*Pluchea odorata*), western goldenrod (*Euthamia occidentalis*), brass buttons, and Baltic rush (*Juncus balticus*) (CDFG 2011).

The nearest CNDDDB record is from June 2005 at Point Edith Wildlife Area, approximately one mile east from the Project Areas. The most recent documented occurrence is from June 2009 in Suisun Marsh, approximately 14 miles north of the Project Areas (CDFG 2011).

Potential to Occur in WMUs

Soft bird's-beak has a high potential to occur in the marsh on the northern boundary of the WMU 10/11/14 Project Area due to the presence of low-growing pickleweed and other associated species, open bare ground, and appropriate hydrologic conditions. This species has a moderate potential to occur in the WMU 31 Project Area due to small patches of pickleweed; however, substantial disturbance to the substrate is present. This species is unlikely to occur in the WMU 32 Project Area due to very little pickleweed and substantial disturbance to the substrate (WRA 2011a). This species was not observed in the Project Areas during 2011 surveys and not observed in tidally-influenced habitat north of WMUs 10/11/14 and southwest of WMU 32 in 2014 (WRA 2015a).

Bolander's water-hemlock; *Cicuta maculata* var. *bolanderi*. CNPS List 2B. Bolander's water-hemlock is a perennial herb in the Apiaceae family. It typically occurs in seasonally saturated substrate in freshwater to brackish coastal marshes at elevations ranging from 0 to 650 feet (CDFG 2011, CNPS 2011). Observed associated species include California tule (*Schoenoplectus acutus*), Baltic rush, cattail (*Typha* spp.), western goldenrod, marsh morning glory (*Calystegia sepium* ssp. *limnophila*), Pacific silverweed (*Potentilla anserina* ssp. *pacifica*), and gumweed (*Grindelia stricta*) (CDFG 2011).

The documented occurrence nearest to the Project Area is from June 1900 in Martinez, approximately 3.5 miles west of the Project Areas (CDFG 2011). The most recent nearby documented occurrence is from June 1992 at Rush Ranch, approximately 13 miles north of the Project Areas (CDFG 2011).

Potential to Occur in WMUs

WMU 10/11/14 and 31

Bolander's hemlock has a high potential to occur in WMUs 10/11/14 and 31, which contains wetland features with perennial hydrology or seasonally saturated emergent vegetation, specifically WMU 31 along the Clean Water Canal and north of WMU 10/11/4. However, these areas are extremely limited within the units. Bolander's hemlock was not observed during rare plant surveys conducted in the WMUs in August 2007 or September 2011 (WRA 2009a; WRA 2009b; WRA 2013a).

WMU 32

Bolander's hemlock has an unlikely potential to occur in WMU 32, which contains a small brackish marsh feature that lacks perennial hydrology (WRA 2013a). Bolander's hemlock was not observed during rare plant surveys conducted in the WMUs in August 2007 or September 2011 (WRA 2009c; WRA 2013a).

Suisun thistle; *Cirsium hydrophilum* var. *hydrophilum*. Federal Endangered; CNPS Rank 1B. Suisun thistle is a perennial herb in the Asteraceae family. It typically occurs in salt marsh and swamp habitat, and is most often in association with tule and saltgrass along small watercourses within marshes at elevations ranging from sea level to 3 feet (CDFG 2010, CNPS 2010). Observed associated species include Olney's bulrush (*Schoenoplectus americanus*), silverweed, perennial pepperweed, cattail, pickleweed, saltgrass, marsh morning glory, and marsh gumplant (*Grindelia stricta* var. *angustifolia*) (CDFG 2010).

The nearest CNDDDB occurrence records of Suisun thistle to the Project Area are from the upper reaches of Suisun Marsh (CDFG 2010). The nearest in the occurrence (2010) is from the edge of slough bank in Suisun Marsh near Suisun City, which is approximately 12.75 miles north of the Project Area.

Potential to Occur in WMUs

WMU 10/11/14

Suisun thistle has a moderate potential to occur in elements of salt marsh vegetation adjacent to muted tidal channels in the Project area north of WMU 10/11/14. It is unlikely to occur within WMUs 10/11/14 because it is disconnected from tidal influence (WRA 2013a). Suisun thistle was not observed during rare plant surveys conducted in August 2007 or September 2011 (WRA 2009a; WRA 2013a).

WMU 31 and 32

Suisun thistle is unlikely to occur in WMU 31 and 32. Although these units contain elements of salt marsh vegetation, it occurs along steep man-made channels disconnected from tidal influence (WRA 2009b,c). This species typically occurs within tidally-influenced salt marsh habitat. Given that WMU 31 and 32 is disconnected from tidal influence, it is unlikely to support Suisun thistle. Suisun thistle was not observed during rare plant surveys conducted in August 2007 or September 2011 (WRA 2009b,c; WRA 2013a).

Dwarf downingia; *Downingia pusilla*. CNPS List 2B. Dwarf downingia is an annual herb in the Campanulaceae family. It typically occurs in mesic valley and foothill grassland, and vernal pool habitat at elevations ranging from 3 to 1460 feet (CDFG 2010, CNPS 2010). Observed associated species include vernal pool popcornflower (*Plagiobothrys stipitatus* var. *stipitatus*), coyote thistle, smooth goldfields (*Lasthenia glaberrima*), common mousetail (*Myosurus minimus*), Oregon woolly marbles (*Psilocarphus oregonus*), semaphore grass, and smooth spike primrose (*Epilobium campestre*) (CDFG 2010).

Potential to Occur in WMUs

Dwarf downingia is unlikely to occur in any of the WMUs (WRA 2013a). Although these units contain seasonal wetlands, this species is known from natural, intact vernal pool complexes. Furthermore, seed sources are limited or absent from the immediate vicinity of the WMUs. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

San Joaquin spearscale; *Extriplex joaquinana* (formerly *Atriplex joaquiniana*). CNPS List 1B. San Joaquin spearscale is an annual herb in the Chenopodiaceae family. It typically occurs in chenopod scrub, alkali meadow, and valley and foothill grassland, is known from salt marshes in San Pablo Bay, and is most often in association with alkali seasonal wetlands and alkali sinks at elevations ranging from 3 to 2740 feet (CDFG 2010, CNPS 2010). Observed associated species include Italian ryegrass, alkali heath, soft chess (*Bromus hordeaceus*), saltgrass, pickleweed, alkali milk-vetch, curved sicklegrass (*Parapholis incurva*), and Contra Costa goldfield (CDFG 2010).

Potential to Occur in WMUs

San Joaquin Spearscale has moderate potential to occur in WMUs 10/11/14, 31, and 32. While none of these units contain intact playa or alkali grassland, this species is somewhat tolerance of disturbance and there is a seed source approximately one mile distant from WMUS 10/11/14 and 31 and less than 0.5 mile distant from WMU 32. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Santa Cruz tarplant; *Holocarpha macradenia*. Federal Threatened; State Endangered; CNPS List 1B. Santa Cruz tarplant is an annual herb in the Asteraceae family that occurs in coastal prairie, coastal scrub, and valley and foothill grassland at elevations ranging from 30 to 720 feet. It typically grows in light, sandy soil or sandy clay, often with nonnatives (CDFW 2021).

Potential to Occur in WMUs

Santa Cruz tarplant has no potential to occur in WMUs 10/11/14, 31, or 32. These units do not contain coastal prairie, coastal scrub, or clay or sandy valley or foothill grassland habitat necessary to support this species This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011a).

Contra Costa goldfields; *Lasthenia conjugens*. Federal Endangered; CNPS List 1B. Contra Costa goldfields is an annual herb in the Asteraceae family. It typically occurs in cismontane woodland, alkaline playa, valley and foothill grassland, and mesic portions of vernal pool habitat at elevations ranging from 0 to 1540 feet (CDFG 2010, CNPS 2010). Observed associated species include Italian ryegrass, smooth goldfields, California goldfields (*Lasthenia californica*), brass buttons, alkali heath, saltgrass, coyote thistle, woolly marbles (*Psilocarphus brevissimus*), early harvest Brodiaea (*Brodiaea coronaria*), common mousetail, flatface calicoflower (*Downingia pulchella*), semaphore grass, aquatic pygmy weed (*Crassula aquatica*), and vernal pool popcornflower.

Contra Costa goldfields has been extirpated across the majority of its range; however, intact populations are located in vernal pools and swales on the northern edge of Suisun Marsh near Suisun City, Fairfield, and Travis Air Force Base, Solano County (CDFG 2010, CCH 2010).

Potential to Occur in WMUs

Contra Costa goldfields is unlikely to occur in WMUs 10/11/14, 31, and 32. Although all three units contain seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Coulter goldfields; *Lasthenia glabrata* ssp. *coulteri*. CNPS List 1B. Coulter goldfields is an annual herb in the Asteraceae family. It typically occurs on alkaline soils in playas, sinks, grasslands, marshes, swamps, and vernal pools at elevations ranging from 0 to 4000 feet (CDFW 2016; CNPS 2016). Observed associated species include pickleweed (*Salicornia pacifica*), salt grass, alkali weed, brass buttons, Mediterranean barley, salt sand spurry (*Spergularia marina*), saltbush (*Atriplex* spp.), and rabbit's foot grass (*Polypogon monspeliensis*) (CDFW 2016).

Potential to Occur in WMUs

The potential for this species to occur within WMUs 10/11/14, 31, and 32 was initially not assessed as there were no documented CNDDDB or CNPS database occurrences within the vicinity of the Project Area. It is assessed here due to an unconfirmed but credible photograph occurrence documented near Martinez (CalPhotos 2016). Coulter goldfields is unlikely to occur in the WMUs because the seasonal wetlands and grasslands are disturbed. *Lasthenia* was not observed in the WMUs during rare plant surveys in 2007 and 2011 (WRA 2009a-c, 2011).

Delta tule pea; *Lathyrus jepsonii* var. *jepsonii*. CNPS List 1B. Delta tule pea is a perennial herb in the Fabaceae family. It typically occurs in freshwater and brackish marsh and swamp habitat, and is most often along marsh and slough margins at elevations ranging from sea level to 15 feet (CDFG 2010, CNPS 2010). Delta tule pea is one of the more common of the Delta rare plants, occurring frequently along slough margins in the brackish to freshwater marshes ringing San Pablo Bay, Suisun Bay, and upper Delta (CDFG 2010). Observed associated species include cattails, California tule, Olney's bulrush (*Schoenoplectus americanus*), Suisun Marsh aster (*Symphotrichum lentum*), western goldenrod, saltgrass, Baltic rush, California rose (*Rosa californica*), coyote brush (*Baccharis pilularis*), and common reed (*Phragmites australis*) (CDFG 2010).

Potential to Occur in WMUs

WMU 10/11/14 and WMU 32

This species is unlikely to occur in the WMU 10/11/14 and 32 Project Areas due to substantial disturbance and the lack of slough or water course margins. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011)

WMU 31

Delta tule pea has a high potential to occur in the WMU 31 Project Area due to the presence of adjacent coastal brackish marsh with associated species in high densities and the adjacent Clean Water Canal and the relative location of the nearest documented Occurrence. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Mason's lilaepsis; *Lilaepsis masonii*. State Rare; CNPS List 1B. Mason's lilaepsis is a rhizomatous herb in the Apiaceae family. It typically occurs in freshwater and brackish marsh and swamp, and riparian scrub, and is most often found on silty or muddy soils in the direct splash line in tidal zones at elevations ranging from 0 to 35 feet (CDFG 2010, CNPS 2010). Observed associated species include cordgrass (*Spartina* spp.), Baltic rush, California tule, Olney's bulrush, low bulrush (*Isolepis cernua*), cattails, Suisun Marsh aster, Delta tule pea, Delta mudwort (*Limosella australis*), and common reed (CDFG 2010).

Potential to Occur in WMUs

Although all three WMUs contain elements of marsh habitat, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs with direct tidal action. Therefore, it is unlikely for this species to occur in WMU 10/11/14, 31, and 32. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Delta mudwort; *Limosella australis* (formerly *L. subulata*). CNPS List 2B. Delta mudwort is a stoloniferous herb in the Scrophulariaceae family. It typically occurs marsh and swamp habitat, and is most often found on mud banks in marsh or scrub riparian at elevations ranging from sea level to 10 feet (CDFG 2010, CNPS 2010). Observed associated species include Mason's lilaepsis, cattails, Baltic rush, Olney's bulrush, low bulrush, Suisun Marsh aster, Delta tule pea, and common reed (CDFG 2010).

Potential to Occur in WMUs

Although all three WMUs contain elements of marsh habitat or muted tidal influence, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs and mud flats with direct tidal action (WRA 2013a). Therefore, it is unlikely for this species to occur within WMU 10/11/14, 31, and 32. This species was not observed during rare plant surveys in 2007 and 2011 (WRA 2009a-c, WRA 2013a).

Marsh microseris; *Microseris paludosa*. CNPS 1B. Marsh microseris is a perennial herb in the Asteraceae family that occurs in close-cone coniferous forest, cismontane woodland, coastal scrub, and valley and foothill grassland at elevations ranging from 20 to 1,160 feet.

Potential to Occur in WMUs

There is no potential for this species to occur in WMUs 10/11/14, 31, or 32, as none of the WMUs contain closed-cone coniferous forest, undisturbed valley and foothill grassland, coastal scrub, or cismontane woodland.

Bearded popcornflower; *Plagiobothrys hystriculus*. CNPS Rank 1B. Bearded popcornflower is an annual herb in the Boraginaceae family. It typically occurs in vernal pool and vernal swale habitat, and is most often found along the margins of vernal wet areas at elevations ranging from sea level to 900 feet (CDFG 2010, CNPS 2010). Observed associated species include Italian ryegrass, coyote thistle, blow wifes (*Achyraea mollis*), toad rush, hyssop loosestrife (*Lythrum hyssopifolia*), spiny fruit buttercup (*Ranunculus muricatus*), and Mediterranean barley (CDFG 2010).

Potential to Occur in WMUs

Bearded popcornflower is unlikely to occur in WMUs 10/11/14, 31, and 32. Although all three WMUs contain seasonal wetlands, this species is known from natural, intact vernal pool complexes. Furthermore, seed sources are limited or absent from the immediate vicinity of the WMUs. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

Marin knotweed; *Polygonum marinense*. CNPS List 3.1. Marin knotweed is an annual herb in the Polygonaceae family that occurs in coastal salt or brackish marshes and swamps at elevations ranging from sea level to 30 feet.

Potential to Occur in WMUs

Marin knotweed is unlikely to occur in WMUs 10/11/14, 31, and 32. Although all three WMUs contain elements of salt marsh vegetation (e.g., pickleweed, salt grass) and are located adjacent muted tidal channels that may support Marin knotweed, this species grows in undisturbed tidal habitat and the WMUs are entirely disturbed. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

California alkali grass; *Puccinellia simplex*. CNPS List 1B. California alkali grass is an annual grass that occurs in chenopod scrub, meadows and seep, valley and foothill grassland, vernal pools, sinks, flats, and lake margins at elevations ranging from 10 to 3,050 feet. It is typically found in alkaline, vernal mesic sinks, flats, and lake margins (CDFW 2021).

Potential to Occur in WMUs

California alkali grass is unlikely to occur in WMUs 10/11/14, 31, and 32. Although all three WMUs contain seasonal wetlands that have a hydroperiod similar to vernal pools, this species is restricted to intact, interior alkali vernal pool complexes which are absent from the WMUs.

Suisun Marsh aster; *Symphotrichum lentum*. CNPS List 1B. Suisun marsh aster is a rhizomatous herb in the Asteraceae family. It typically occurs in densely vegetated and margins of brackish and freshwater marsh and swamp habitat, often on slough banks and berms at elevations ranging from sea level to 10 feet (CDFG 2010, CNPS 2010). Suisun Marsh aster is one of the more common of the Delta rare plants, occurring frequently along slough margins and berms in the brackish to freshwater marshes ringing San Pablo Bay, Suisun Bay, and the upper Delta (CDFG 2010). Observed associated species include Delta tule pea, soft bird's-beak, cattails, Olney's bulrush, California tule, common reed, saltgrass, western goldenrod, and marsh fleabane.

Potential to Occur in WMUs

Suisun Marsh aster has a high potential to occur in the WMUs due to the presence of brackish and freshwater marsh with associated species in high densities, the presence of sloughs and cross cut channels, the relative location of the nearest occurrence, and this species high tolerance of disturbed conditions. The nearest and most recent occurrence is from September 2004, on the bank of Pacheco Slough, approximately one mile west of the WMUs. This species was not observed during rare plant surveys conducted in the WMUs in 2007 and 2011 (WRA 2009a-c, 2011).

Saline clover; *Trifolium hydrophilum* (formerly *Trifolium depauperatum* var. *hydrophilum*). CNPS List 1B. Saline clover is an annual herb in the Fabaceae family. It typically occurs in marsh and swamp, mesic valley and foothill grassland, and vernal pool habitat at elevations ranging from sea level to 985 feet (CDFG 2010, CNPS 2010). Observed associated species include bearded clover (*Trifolium barbigerum*), pale sack clover (*T. fucatum*), spiny fruit buttercup, hyssop loosestrife, Italian ryegrass, and brass buttons (CDFG 2010).

Potential to Occur in WMUs

Although all three WMUs contain seasonal wetlands, saline clover is unlikely to occur in WMUs 10/11/14, 31, and 32 due to lack of natural, intact vernal pool complexes or seed sources from the immediate vicinity. Furthermore, seed sources are limited or absent from the immediate vicinity. This species was not observed during rare plant surveys conducted in 2007 and 2011 (WRA 2009a-c, 2011).

3.2 Special Status Wildlife

Several biological resource assessment, breeding bird surveys, and Rail surveys have been conducted within the Project Area. Of the special-status wildlife species identified in or near to the Project Area, several special-status species were determined to have a Moderate, High, or Present potential in the WMUs. These species potentials are summarized and discussed below.

3.2.1 Summary of Special Status Wildlife

WMUs 10/11/14

- Salt marsh harvest mouse; *Reithrodontomys raviventris*: Moderate Potential
- Burrowing owl; *Athene cunicularia*: Moderate Potential and observed in WMU
- California black rail; *Laterallus jamaicensis coturniculus*: Unlikely Potential
- California Ridgway's rail; *Rallus obsoletus obsoletus*: Unlikely Potential
- Northern harrier; *Circus cyaneus*: Present
- Saltmarsh common yellowthroat; *Geothlypis trichas sinuosa*: Moderate Potential
- Suisun song sparrow; *Melospiza melodia maxillaris*: Present
- Tricolored blackbird; *Agelaius tricolor*: Unlikely Potential
- White-tailed kite; *Elanus leucurus*: Moderate Potential
- Western pond turtle; *Actinemys marmorata*: Moderate Potential

Of these ten special-status wildlife, three species have been observed during protocol-level surveys or routine site visits for WMUs 10/11/14.

WMU 31

- Salt marsh harvest mouse; *Reithrodontomys raviventris*: Moderate Potential
- Burrowing owl; *Athene cunicularia*: Moderate Potential
- California black rail; *Laterallus jamaicensis coturniculus*: Unlikely Potential
- California Ridgway's rail; *Rallus obsoletus obsoletus*: Unlikely Potential
- Northern harrier; *Circus cyaneus*: Present
- Saltmarsh common yellowthroat; *Geothlypis trichas sinuosa*: Moderate Potential
- Suisun song sparrow; *Melospiza melodia maxillaris*: Present
- Tricolored blackbird; *Agelaius tricolor*: Unlikely Potential
- White-tailed kite; *Elanus leucurus*: Moderate Potential
- Western pond turtle; *Actinemys marmorata*: Moderate Potential

Of these ten special-status wildlife, two species have been observed during protocol-level surveys or routine site visits for WMU 31.

WMU 32

- Salt marsh harvest mouse; *Reithrodontomys raviventris*: Moderate Potential
- Burrowing owl; *Athene cunicularia*: Moderate Potential
- California black rail; *Laterallus jamaicensis coturniculus*: Unlikely Potential
- California Ridgway's rail; *Rallus obsoletus obsoletus*: Unlikely Potential

- Northern harrier; *Circus cyaneus*: Moderate Potential
- Saltmarsh common yellowthroat; *Geothlypis trichas sinuosa*: Moderate Potential
- Suisun song sparrow; *Melospiza melodia maxillaris*: High Potential
- Tricolored blackbird; *Agelaius tricolor*: Unlikely Potential
- White-tailed kite; *Elanus leucurus*: Moderate Potential
- Western pond turtle; *Actinemys marmorata*: Moderate Potential

Of these ten special-status wildlife, none have been observed during protocol-level surveys or routine site visits for WMU 32.

3.2.2 Potential Special Status Species

The following is a summary of each special-status wildlife species and their potential in the WMUs. Expanded summaries have been provided for salt marsh harvest mouse (SMHM), California black rail (CBR), and California Ridgway's rail (CRR). The species are organized by mammals, birds, and reptiles & amphibians, and by alphabetical order within each group.

Mammals

Salt marsh harvest mouse, (*Reithrodontomys raviventris*) Federal Endangered, State Endangered and CDFW Fully Protected. The SMHM is a relatively small rodent found only in suitable salt- and brackish-marsh habitat in the greater San Francisco Bay, San Pablo Bay, and Suisun Bay areas. The habitat associated with SMHM has been described as pickleweed-dominated vegetation (Fisler 1965), though more recent studies have shown that SMHM is supported equally in pickleweed-dominated and mixed vegetation (including native and non-native salt- and brackish-marsh species) (Sustaita et al. 2005, Sustaita et al. 2011). SMHM prefers deep, dense vegetative cover between 11.8 and 23.6 inches height (USFWS 1984), though there are indications that shorter stands (5.9 inches is the shortest commonly used) of pickleweed may also support an abundance of this species (Fisler 1965; Shellhammer et al. 1982; USFWS 2013). Another key habitat requirement for this species is upland or tidal refuge habitat, which is used to escape high tides and storm events. Persistent, low numbers of SMHM are also found in grasslands at least 330 feet (100 meters) from the edge of marsh habitat, though their presence in grasslands may be seasonal and opportunistic (USFWS 2013).

Potential to Occur in WMUs

SMHM has a moderate potential to occur within WMUs 10/11/14, 31 and 32. The WMUs contain wetland communities suitable for this species. Additionally, upland communities adjacent to marshes present within the WMUs may be used opportunistically for foraging by this species. The nearest documented occurrences are in Point Edith Wildlife Area and across Pacheco Creek west of the WMUs.

Section 7 Consultation

The USACE initiated consultation with the USFWS under Section 7 of the Federal Endangered Species Act for SMHM on July 16, 2012. The USFWS issued a BO on November 17, 2017.

Habitat Assessment

On March 12 and 13, 2013, WRA biologists conducted site visits to WMUs 10/11/14, 31 and 32 to map SMHM habitat based on a request from the Service (2013a). Areas considered “potential habitat” were distinguished from non-habitat using a list of habitat suitability criteria taken from the available scientific literature and recovery documents. Criteria used to determine which areas to include or exclude were based on structural components of the vegetation, such as percent cover, height, and the structure provided by dominant plant species (WRA 2013b). Detailed methods to evaluate potential habitat in the WMUs are contained in (WRA 2013b). *WRA mapping*

WRA mapped potential SMHM habitat in and around the WMUs as shown on the attached figures 1, 2, and 3 (WRA 2013b).

Based on the criteria, WRA mapped potential SMHM habitat (WRA 2013b) and used this information as a basis for examining potential effects to SMHM habitat in upland and wetland areas within the Project Area. Mapped SMHM habitat within the Project Area is presented below in Table 1 and Figures 1, 2, and 3 (Appendix A); this information was also presented in the Biological Assessment (WRA 2017a). Approximately 53 acres provide potential habitat for the SMHM within the WMUs. Habitat within the Project Area is largely considered low quality due to the structure of vegetation present, the limited expanse of year-round vegetative cover, and the seasonal nature of the plant communities within the WMUs. The WMUs are dominated by annual, non-native grassland communities which do not provide cover or sources of food for SMHM year-round due to seasonal vegetation die-back. There is no evidence in the available literature to suggest that these areas are used by SMHM as more than opportunistic or seasonal habitat (WRA 2013b).

Due to the overall low quality of potential habitat within the WMUs, and because the WMUs do not provide enough area to be considered a Viable Habitat Area as defined by the USFWS (2013b), there is only moderate potential that the WMUs could support a population of SMHM in their current condition (WRA 2017a).

Table 1. SMHM Habitat Summary

PROJECT AREA	SMHM UPLAND SEASONAL HABITAT (ACRES)	SMHM SEASONAL WETLAND HABITAT (ACRES)	TOTAL SMHM HABITAT (ACRES)
WMUs 10/11/14	8.77	5.14	13.91
WMU 31	16.97	14.79	31.76
WMU 32	5.04	2.36	7.40
Total SMHM Habitat			53.07

WMU Closure Impacts to SMHM Habitat

A total of 2.96 acres of seasonal SMHM wetland habitat and 8.31 acres of seasonal SMHM upland habitat will be permanently impacted as a result of the WMU closure actions. A total of 5.46 acres of seasonal SMHM wetland habitat and 19.18 acres of SMHM upland habitat will be temporarily impacted. A summary of impacts to wetland and upland SMHM habitat is provided below in Table 2 and Figure 4 (WRA 2017a).

Table 2. Summary of Impacts to SMHM Habitat

HABITAT / IMPACT TYPE	WMUs 10/11 (ACRES)	WMU 14 (ACRES)	WMU 31 (ACRES)	WMU 32 (ACRES)	TOTAL (ACRES)
Permanent Impacts					
<i>SMHM Upland Habitat</i>	0	3.35	0	4.96	8.31
<i>SMHM Wetland Habitat</i>	0	0.86	0	2.10	2.96
Total Permanent Impacts	0	4.21	0	7.06	11.27
Temporary Impacts					
<i>SMHM Upland Habitat</i>	4.41	0	13.69	0	18.10
<i>SMHM Wetland Habitat</i>	2.47	0	2.37	0	4.84
Total Temporary Impacts	6.88	0	16.06	0	22.94
Impacts to Habitat Restored in Uplands					
<i>SMHM Upland Habitat</i>	0	0	1.08	0	1.08
<i>SMHM Wetland Habitat</i>	0	0	0.62	0	0.62
Total Habitat Restored in Uplands	0	0	1.70	0	1.70

Compensation for Impacts

Compensation within WMUs

WMUs 10, 11, and 31 will be restored after waste removal (WRA 2017a). SMHM habitat restoration will occur concurrently with the wetland and upland revegetation efforts. As the species used in the revegetation plan are also species found in existing SMHM habitat, it is anticipated that wetland and upland revegetation efforts will result in the restoration of suitable SMHM habitat. A summary of SMHM habitat restoration is provided in table 3 (WRA 2017a).

Table 3. WMU SMHM Habitat Restoration Area Summary

RESTORATION TYPE	WMUs 10/11 (ACRES)	WMU 31 (ACRES)	TOTAL (ACRES)
<i>SMHM Upland Habitat Restoration (in-situ)</i>	2.46	11.72	14.18
<i>SMHM Upland Habitat Re-establishment</i>	3.28	5.91	9.19
Total SMHM Upland Habitat Restoration	5.74	17.63	23.37
<i>SMHM Wetland Habitat Restoration (in-situ)</i>	0.80	2.03	2.83
<i>SMHM Wetland Habitat Re-establishment</i>	2.86	3.87	6.73
Total SMHM Seasonal Wetland Habitat Restoration	3.66	5.90	9.56
Total SMHM Habitat Restoration for Temporary Impacts	9.40	23.53	32.93

Compensation for Temporary Mitigation Impacts

SMHM habitat restoration will occur concurrently with the mitigation wetland and upland revegetation efforts.

Cordelia Slough Preserve

The Applicant proposes to preserve and manage land to conserve the species and to offset temporary and permanent impacts to potential SMHM habitat due to Project activities. A total of 83.09 acres would be preserved through the preservation and management of high quality SMHM habitat in perpetuity at the Cordelia Slough Preserve; a 2:1 ratio for temporary impacts less than 24 months and a 3:1 ratio for permanent impacts (WRA 2017a).

North Suisun Mitigation Bank

Although the Applicant is not relying on the North Suisun Mitigation Bank credits to offset potential SMHM impacts, it should be acknowledged that the North Suisun Mitigation Bank does lie within a Recovery Unit (Segment B) of the Recovery Plan for SMHM and other marsh species (Service 2013b). Please see Figure 5 which illustrates the location of the North Suisun Mitigation Bank (labeled "Conservation Bank" in the figure) in relation to the Suisun Bay Recovery Unit. This figure, taken from the Recovery Plan, shows that zone 1 planned restoration areas, such as the wetlands and upland grassland habitat located in North Suisun Bank, are appropriate for SMHM compensation. The Recovery Plan indicates that the northern edges of the plan maps for Suisun Bay are ideal for ecotone restoration. Although the Applicant's purchase of credits is not strictly intended to benefit the SMHM, the North Suisun Mitigation Bank will benefit the Suisun Marsh and special-status species therein (WRA 2013b).

Birds

Burrowing owl (*Athene cunicularia*). CDFW Species of Special Concern; USFWS Bird of Conservation Concern. The burrowing owl occurs as a year-round resident and winter visitor in much of California's lowlands, inhabiting open areas with sparse or non-existent tree or shrub canopies. Typical habitat is annual or perennial grassland, although human-modified areas such as agricultural lands and airports are also used (Poulin et al. 2011). This species is dependent on burrowing mammals to provide the burrows that are characteristically used for shelter and nesting, and in northern California is typically found in close association with California ground squirrels (*Spermophilus beecheyi*). Manmade substrates such as pipes or debris piles may also be occupied in place of burrows. Prey consists of insects and small vertebrates. Breeding typically takes place from March to July.

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017.

The burrowing owl is Present within WMU 10/11/14. A burrowing owl was observed by a refinery worker around February 2014 (Figure 6, Appendix C). No evidence of a breeding owl was observed during rail surveys in early March of 2014 (Appendix C).

The burrowing owl has a moderate potential to occur within WMUs 31 and 32. Much of this area contains bare ground or short vegetation, and there are some burrows in these areas suitable for occupation by this species. California ground squirrels and burrows have been observed in the area. The nearest documented occurrence of burrowing owl is approximately 1.5 miles south of

this area (CDFW 2017). This species has not been observed breeding in the WMUs during rail surveys (WRA 2008b-d, 2009d-f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b) and WMU 32 breeding bird surveys in 2010, 2015, 2016, and 2018 (Appendix C).

California black rail (*Laterallus jamaicensis coturniculus*), State Threatened, CDFW Fully Protected Species, USFWS Bird of Conservation Concern. The CBR is the resident black rail subspecies that occurs in California coastal salt and brackish marshes from Bodega Bay to Morro Bay, with additional populations known from freshwater marshes near or in the northern Sierra Nevada foothills (Eddleman et al. 1994, Richmond et al. 2008). According to a published analysis by Spautz et al. (2005), important habitat elements for this species within the San Francisco Bay estuary are: 1) emergent marsh dominated by pickleweed, marsh gumplant (*Grindelia stricta*), bulrush (*Scirpus maritimus*), rushes (*Juncus* spp.), and/or cattails (*Typha* spp.); 2) high density of vegetation below four inches in height; 3) high marsh elevation with transitional upland vegetation; 4) large total area of contiguous marsh; 5) proximity to a major water source; and, 6) isolation from disturbance. This species feeds primarily on invertebrates. Black rails are extremely secretive and very difficult to glimpse or flush; identification typically relies on voice. Nests are placed on the ground in dense wetland vegetation.

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017 (Figure 7).

WMU 10.11.14

The CBR has an unlikely potential to occur within WMUs 10/11/14. The Project Area lacks direct tidal influence and provides only marginal habitat. However, tidal/brackish wetlands containing dense pickleweed vegetation are present near Project Area in Hastings Slough and across a railroad line and a road in Point Edith Wildlife Area. This species has been observed (CDFW 2017) in the Point Edith Wildlife Area. Black rails have been detected in Hastings Slough and in the Point Edith Wildlife Area during Project Area surveys. Pickleweed is present within the Project Area, but not large expanses suitable to support black rail or foraging habitat (tidal sloughs or other areas with dense veg). WRA has surveyed the Project Area in multiple years and has not detected black rails nesting within the Project Area.

A CBR was detected in WMU 11 during a protocol-level California Ridgeway's Rail survey visit in 2014. CBR was not detected during a subsequent survey visit in 2014. CBR have not been detected in the WMUs before or after the detection (Figure 7).

The pickleweed habitat north of WMU 10/11/14 adjacent to the railroad tracks in the northeast portion of the Project Area is also unlikely to support rails because of its limited expanse and nearness to an active railroad line.

Suitable breeding habitat does not exist for this species in the Project Area. Suitable breeding habitat may exist, however, in the marsh habitat to the east of the Project Area, north of the outer coke pond (WRA 2009a).

WMU 31

The CBR has an unlikely potential to occur within WMU 31. The Project Area lacks direct tidal influence and provides only highly marginal habitat. However, tidal/brackish wetlands containing dense pickleweed vegetation are present west across the Clean Water Canal in Point Edith Wildlife Area, where this species has been (CDFW 2017) and detected during Project Area surveys (Figure 7). Pickleweed is present within the Project Area, but not large expanses suitable to support black rail or foraging habitat (tidal sloughs or other areas with dense veg). In addition, WRA has surveyed the Project Area for California Ridgeway's rail during multiple years and has not detected black rails present or nesting within the Project Area.

WMU 32

The CBR has an unlikely potential to occur within WMU 32. The Project Area lacks tidal influence and provides only marginal habitat. Potential suitable habitat with no documented occurrences is present west of Project Area along the west bank of Lower Walnut Creek. Pickleweed is present within the Project Area, but not large expanses suitable to support black rail or foraging habitat (tidal sloughs or other areas with dense veg). In addition, WRA has surveyed the Project Area for nine consecutive years (2008-2016) and has not detected black rails present or nesting within the Project Area. One black rail was detected in the west bank of Lower Walnut Creek during a survey in 2009 and a black rail was detected in 2017 east of the WMU across Lower Walnut Creek south of the Union Pacific Railroad tracks (Figure 7).

Other Refinery Studies

Regulatory Closure of WMU 4

During the closure of another waste management unit, WMU-4 black rails surveys were performed. WMU-4 is located south of the WMU 10/11/14, 31, 32 work areas. Given the estimated high density of Black Rails in the nearby Point Edith Wildlife Area, and presence of suitable vegetative characteristics, there was a moderate potential for Black Rail to occur in and around WMU-4 (WRA 2008a). Black rail surveys conducted in 2008, 2009, 2010, 2011, and 2012 did not detect the species in the marshlands associated with Hastings Slough (WRA 2012a, 2012b).

California Ridgeway's (clapper) rail (*Rallus obsoletus obsoletus*). Federal Endangered, State Endangered, CDFW Fully Protected Species. The CRR, formerly known as California clapper rail (*R. longirostris obsoletus*), is the resident Ridgeway's/clapper rail subspecies of northern and central California. Although more widespread in the past, it is currently restricted to the San Francisco Bay estuary. The CRR occurs only within salt and brackish marshes. According to Harvey (1988), Shuford (1993) and Eddleman and Conway (1998), important CRR habitat components are: 1) well-developed tidal sloughs and secondary channels; 2) beds of cordgrass (*Spartina* spp.) in the lower marsh zone; 3) dense salt marsh vegetation for cover, nest sites, and brooding areas; 4) intertidal mudflats, gradually sloping banks of tidal channels, and cordgrass beds for foraging; 5) abundant invertebrate food resources; and 6) transitional vegetation at the marsh edge to serve as a refuge during high tides. In south and central San Francisco Bay and along the perimeter of San Pablo Bay, CRR typically inhabits salt marshes dominated by pickleweed and cordgrass. Brackish marshes supporting CRR occur along major sloughs and rivers of San Pablo Bay and along tidal sloughs of Suisun Marsh. Nesting occurs

from March through July, with peak activity in late April to late May (DeGroot 1927, Harvey 1980, Harvey 1988). CRR nests, constructed of wetland vegetation and platform-shaped, are placed near the ground in clumps of dense vegetation, usually in the lower marsh zone near small tidal channels (DeGroot 1927, Evens and Page 1983, Harvey 1988).

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017 (WRA 2008b-d, 2009d-f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b).

WMU 10.11.14

The CRR has an unlikely potential to occur within WMUs 10/11/14. The Project Area lacks tidal influence and provides no suitable habitat. Tidal/brackish wetlands containing dense pickleweed vegetation are present near Project Area in Hastings Slough and across a railroad line and a road in Point Edith Wildlife Area, where this species has a documented occurrence (CDFW 2021). WRA has surveyed the Project Area for multiple years and has not detected rails nesting within the Project Area or Point Edith Wildlife Area or Hastings Slough.

WMU 31

The CRR has an unlikely potential to occur within WMU 31. The Project Area lacks tidal influence and provides no suitable habitat. Tidal/brackish wetlands are present adjacent to the Project Area in Point Edith Wildlife Area, where this species has a documented occurrence (CDFW 2021). During a single Project Area survey, one individual was observed in 2009 moving through Point Edith Wildlife Area (WRA 2009b). WRA has surveyed the Project Area for multiple years and has not detected Ridgeway's rails nesting within the Project Area or the adjacent Point Edith Wildlife Area.

WMU 32

The CRR has an unlikely potential to occur within WMU 32. No suitable habitat (tidal salt marsh or mudflats) is present in the Project Area. Potential suitable habitat with no documented occurrences is present west of Project Area along the west bank of Lower Walnut Creek. No CRRs have been detected within 700 feet of WMU 32 Project Area during nine consecutive years (2008-2016) of rail surveys at WMU 32.

Summary

WRA has been conducting rail surveys at WMUs 10/11/14, 31 and 32 since 2008 to support WMU Closure activities, an effort of 332 hours over 80 days. Surveys from 2008 and 2009 were reconnaissance surveys to support assessment of WMU biological resources. Surveys from 2011 to 2017 were USFWS-approved protocol-level surveys conducted to support investigation and studies within the WMUs, or as an ongoing effort to demonstrate absence of CRR during the Section 7 Consultation. The last protocol-level surveys were conducted in 2017.

From 2008 through 2017, seven protocol-level surveys were conducted at WMU 31, seven surveys for WMU 32, and six surveys for WMU 10/11/14. Of those 20 surveys, the California Ridgeway's Rail did not occur within any of the WMU Project Areas.

No nesting CCR have been detected within or immediately adjacent to the Refinery since WRA initiated surveys of the WMUs in 2008, and only one detection of a single, unanswered call from a single individual has been documented within or adjacent to the Refinery. No habitat for CCR exists within the Project Area, nor have CCRs been detected immediately adjacent to the Refinery in potential habitat; though they may occasionally use higher elevation marsh areas or marsh/upland transition zones in the vicinity of the Refinery to escape high tides (WRA 2008b-d, 2009d-f, 2012b, 2013a, 2014, 2015b, 2016a, 2017b).

Occurrences

One California Ridgeway's Rail was detected north of WMU 31 within Point Edith Wildlife Area during a single (of four total) protocol-level rail survey visit on March 17, 2009 (WRA 2009b).

The detected CRR gave a single rapid series of "kek" calls on March 17, approximately 340 feet from the northern boundary of WMU 31. This call did not elicit any response, and CRR was not heard during any of the following surveys. The 10 years of surveys suggest that CRR is not breeding within the immediate vicinity of the Project Area and will likely not negatively impact CRR nor constitute "take" under the Federal Endangered Species Act.

Assessment

Positive indicators of CRR habitat include tidal-influenced, emergent marsh areas with dense pickleweed and bulrush cover, exposed mudflats and tidal channels for foraging, transitional upland vegetation to provide refugia during higher tides (Shuford, 1993; Eddlemand and Conway, 1998). The Project Areas do not contain tidally influenced sloughs or the dense vegetation the CRR needs to thrive within its environment.

Adjacent habitat at Point Edith Wildlife Area exhibits positive indicators for CRR habitat but has only been detected once in the area. Therefore, it is concluded that the occurrence of CRR within the Project Area is highly unlikely.

Mitigation

WRA and Johnson Marigot Consulting proposed to the USFWS that construction work would not disturb CRR due to CRR being consistently absent within the Project Area. It was proposed that the remediation and restoration of 38.2 acres of seasonal wetlands on the project site would provide prime habitat for CRR in the future and therefore no mitigation credits would need to be purchased (Johnson 2017, Sanchez 2017). USFWS stated that if ART could not agree to avoid construction within 700 feet of CRR's during breeding season, then ART should compensate by funding the restoration or preservation of a breeding territory at a Service-approved location (Johnson 2017, Service 2017).

On July 5, 2017, ART concluded to fund the restoration of 5.5 acres of tidal marsh habitat for the CRR through channel excavation and creation of marsh mounds in the Sonoma Creek Marsh

Enhancement Project at the San Pablo Bay National Wildlife Refuge as offsite compensatory mitigation for the effects of the project on the CRR.

Northern harrier (*Circus hudsonius [cyaneus]*). CDFW Species of Special Concern. The northern harrier occurs as a resident and winter visitor in open habitats throughout most of California, including freshwater and brackish marshes, grasslands and fields, agricultural areas, and deserts. Harriers typically nest in treeless areas within patches of dense, relatively tall, vegetation, the composition of which is highly variable; nests are placed on the ground and often located near water or within wetlands (Shuford and Gardali 2008). Harriers are birds of prey and subsist on a variety of small mammals and other vertebrates.

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017.

The northern harrier is Present within WMUs 10/11/14 and 31. This species was observed foraging over WMU 10/11/14 and 31 during a site visit in 2007 (WRA 2009a, 2009b). These WMUs provides some open foraging habitat for this species and portions of low wetland vegetation suitable for nesting.

The northern harrier has a moderate potential to occur within WMU 32. The WMUs provides some open foraging habitat for this species, and northern portions of the area contain low wetland vegetation suitable for nesting. No northern harrier were observed in this unit; however, skeletal remains of a northern harrier were found in the northwest portion of WMU 32 during a site visit on August 10, 2017 (WRA 2009c).

San Francisco (saltmarsh) common yellowthroat (*Geothlypis trichas sinuosa*), USFWS Bird of Conservation Concern, CDFW Species of Special Concern. This subspecies of the common yellowthroat is found in freshwater marshes, coastal swales, riparian thickets, brackish marshes, and saltwater marshes. Their breeding range extends from Tomales Bay in the north, Carquinez Strait to the east, and Santa Cruz County to the south. This species requires thick, continuous cover such as tall grasses, tule patches, or riparian vegetation down to the water surface for foraging and prefers willows for nesting (Shuford and Gardali 2008).

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017.

The San Francisco (saltmarsh) common yellowthroat is has a moderate potential to occur within WMUs 10/11/14, 31 and 32. This species was not observed during field visits. However, the WMUs contain areas of inundation and associated marsh vegetation that may support nesting of this species. This species is also known from the vicinity and is presumably present in wetland areas adjacent to the Project Area (WRA 2009a, 2009b, 2009c). According to a report done by ESA (2002), this species was observed at multiple locations throughout the refinery during 1994 surveys.

Suisun song sparrow (*Melospiza melodia maxillaris*), CDFW Species of Special Concern, USFWS Bird of Conservation Concern. This songbird nests in tidal marsh vegetation and adjacent weedy vegetation on levees. According to ESA (2002), Suisun song sparrows were observed at Point Edith in 1999 and 2000.

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017.

The Suisun song sparrow is Present within WMUs 10/11/14 and 31. These WMUs and adjacent wetland areas have wetland emergent vegetation to support nesting and foraging of this subspecies. During a site assessment of WMU 10/11/14 on August 15, 2007, this subspecies was observed within the cattail-tule dominated marsh and adjacent upland vegetation east of the unit (WRA 2009a). The species was also observed foraging during the site assessments of WMU 31 in 2007 within cattail-tule dominated marsh within the WMU and adjacent upland vegetation (WRA 2009b). During a 2007 site assessment conducted for a related project in WMU 4 of the refinery, WRA biologists also observed several song sparrows, assumed to be of this subspecies (WRA 2008a,b).

The Suisun song sparrow has a high potential to occur within WMU 32. Marsh vegetation provides small areas of breeding and foraging habitat for this species. While the species has not been observed in WMU 32, it has been observed within the refinery by WRA Biologists (2009c).

Tricolored blackbird (*Agelaius tricolor*). State Candidate (Endangered), CDFW Species of Special Concern, USFWS Bird of Conservation Concern. The tricolored blackbird is a locally common resident in the Central Valley and along coastal California. Most tricolored blackbirds reside in the Central Valley March through August, then moving into the Sacramento-San Joaquin Delta and east to Merced County and coastal locations during winter (Meese et al. 2014). This species breeds adjacent to fresh water, preferring emergent wetlands with tall, dense cattails or tules, thickets of willow or blackberry, and/or tall herbs. Flooded agricultural fields with dense vegetation are also used (Shuford and Gardali 2008). This species is highly colonial. The tricolored blackbird often intermingles with other blackbird species during the non-breeding season. Individuals typically forage up to 5.6 miles (9 kilometers) from their colonies although in most cases only a small part of the area within this range provides suitable foraging (Hamilton and Meese 2006).

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017.

The tricolored blackbird has an unlikely potential to occur within WMUs 10/11/14, 31 and 32. There is generally no suitable habitat for foraging and nesting found in the WMUs. WMU 32 contains only small areas of inundation and tall marsh vegetation that may support nesting of this species. The Clean Water Canal adjacent to WMU 31 has suitable breeding habitat. The nearest documented nesting colony is around 2 miles from WMU 32 (CDFG 2009).

White-tailed kite (*Elanus leucurus*). CDFW Fully Protected Species. The white-tailed kite is resident in open to semi-open habitats throughout the lower elevations of California, including grasslands, savannahs, woodlands, agricultural areas and wetlands. Vegetative structure and prey availability seem to be more important habitat elements than associations with specific plants or vegetative communities (Dunk 1995). Nests are constructed mostly of twigs and placed in trees, often at habitat edges. Nest trees are highly variable in size, structure, and immediate surroundings, ranging from shrubs to trees greater than 150 feet tall (Dunk 1995). This species preys upon a variety of small mammals, as well as other vertebrates and invertebrates.

Potential to Occur in WMUs

This species has not been observed nesting in the WMUs during breeding bird surveys including Rail surveys at the units from 2007 to 2017.

The white-tailed kite has a moderate potential to occur within WMUs 10/11/14, 31, and 32. The WMUs contain open grassland habitat that may provide foraging habitat for this species. Shrubs in the WMUs, though suboptimal, may also provide breeding habitat. There are also suitably large trees and shrubs to support nesting along Lower Walnut Creek near WMU 32 (WRA 2009c). This species has been documented to forage on and adjacent to the refinery (ESA 2002), including a sighting on August 27, 2007, by a WRA biologist north of Waterfront Road, 1.5 miles east of WMU 10/11/14 (WRA 2009a).

Reptiles & Amphibians

Western pond turtle (*Actinemys marmorata*), CDFW Species of Special Concern. The Western pond turtle is the only native freshwater turtle in California. This turtle is uncommon to common in suitable aquatic habitat throughout California, west of the Sierra-Cascade crest and Transverse Ranges. Western pond turtle inhabits annual and perennial aquatic habitats, such as coastal lagoons, lakes, ponds, marshes, rivers, and streams from sea level to 5,500 feet in elevation. Pond turtle also occupies man-made habitats such as stock ponds, wastewater storage, percolation ponds, canals, and reservoirs. This species requires low-flowing or stagnant freshwater aquatic habitat with suitable basking structures, including rocks, logs, algal mats, mud banks and sand. Warm, shallow, nutrient-rich waters are ideal as they support western pond turtle prey items, which include aquatic invertebrates and occasionally fish, carrion, and vegetation. Turtles require suitable aquatic habitat for most of the year; however, the species often occupies creeks, rivers, and coastal lagoons that become seasonally unsuitable. To escape periods of high water flow, high salinity, or prolonged dry conditions, western pond turtle may move upstream and/or take refuge in vegetated, upland habitat for up to four months (Rathbun et al. 2002). Although upland habitat is utilized for refuging and nesting, this species preferentially utilizes aquatic and riparian corridors for movement and dispersal.

Western pond turtle nests from late April through July. This species requires open, dry upland habitat with friable soils for nesting and prefer to nest on unshaded slopes within 15 to 330 feet of suitable aquatic habitat (Rathbun et al. 1992). Females venture from water for several hours in the late afternoon or evening during the nesting season to excavate a nest, lay eggs, and bury the eggs to incubate and protect them. Nests are well-concealed, though native mammals are occasionally able to locate and predate upon eggs. Hatchlings generally emerge in late fall but may overwinter in the nest and emerge in early spring of the following year.

Potential to Occur in WMUs

The western pond turtle has a moderate potential to occur within WMUs 10/11/14, 31 and 32. While no western pond turtles have been observed during WRA's site visits, the WMUs contain aquatic features that may support this species and are adjacent to suitable foraging and nesting habitat. This suitable adjacent habitat includes the Clean Water Canal and nearby upland habitat, which is adjacent to much of WMU 31. Additionally, while there is no suitable aquatic habitat within the WMU 32, much of the unit is located within 400 meters of Pacheco Creek where western pond turtle has previously occurred (CDFG 2009). Within WMU 32, suitable nesting habitat of pickleweed is located in the southwestern corner of the unit. The nearest documented occurrence of western pond turtle is approximately 0.5 miles west of the WMUs (CDFW 2021).

WRA biologists have also conducted a biological resources assessment for the nearby WMU 4. The assessment found that western pond turtle has a moderate potential to be present in the unit. However, due to the compacted soils in the uplands, they are unlikely to nest. No western pond turtles were observed during a site visit on April 30, 2007, and no western pond turtles were observed during active surveys conducted from June 2012 to January 2013 (Appendix E).

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APPENDIX A - FIGURES

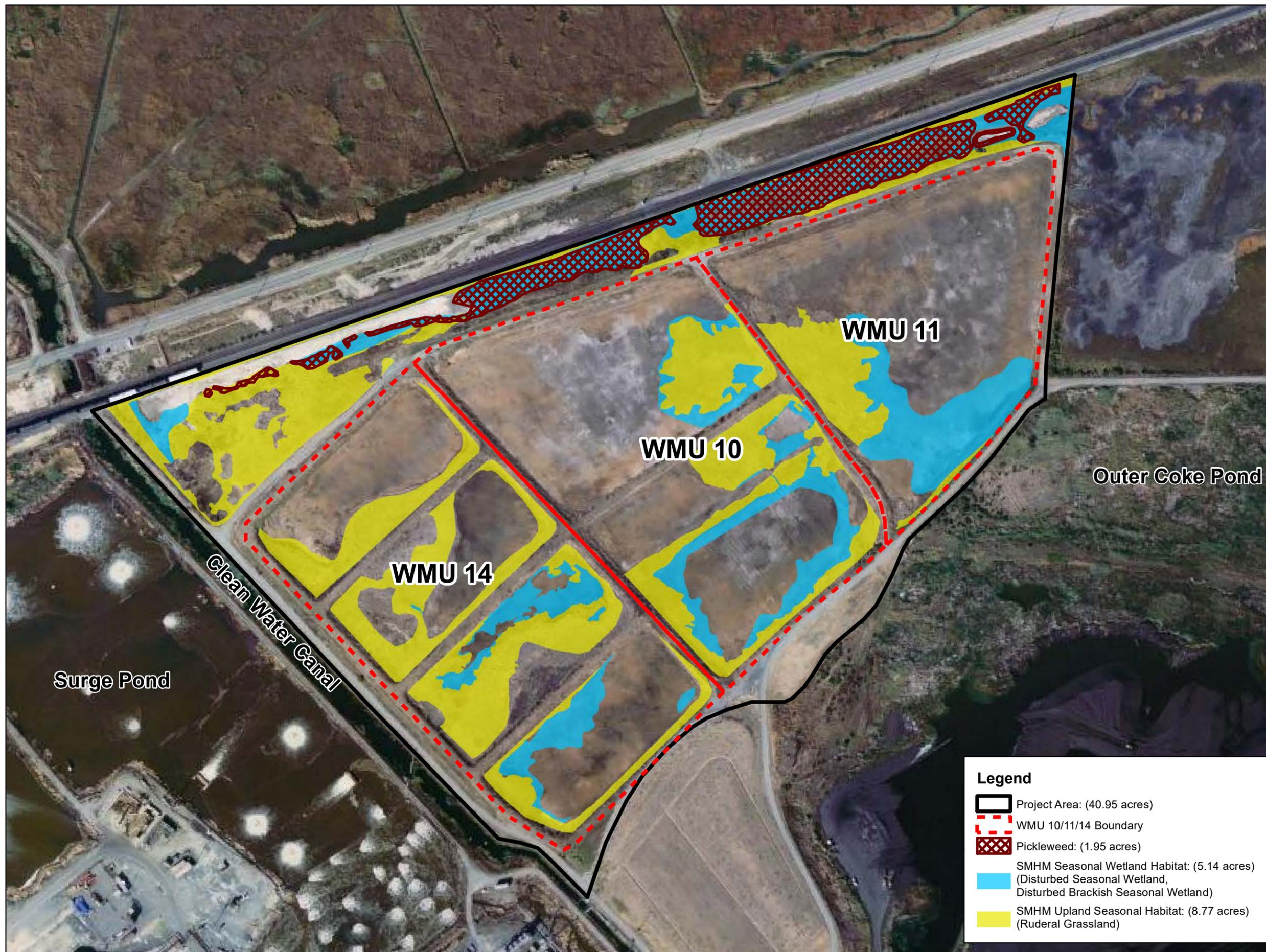
Figure 1. (WRA 2013)



ENVIRONMENTAL CONSULTANTS
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Golden Eagle Refinery
WMUs 10/11/14
Contra Costa County,
California

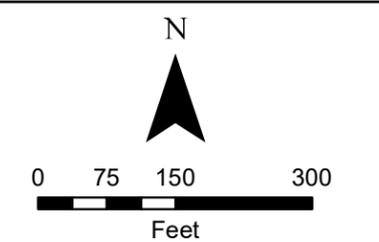
Figure 3.
WMUs 10/11/14
Potential Salt Marsh
Harvest Mouse
Habitat



Legend

- Project Area: (40.95 acres)
- WMU 10/11/14 Boundary
- Pickleweed: (1.95 acres)
- SMHM Seasonal Wetland Habitat: (5.14 acres)
(Disturbed Seasonal Wetland,
Disturbed Brackish Seasonal Wetland)
- SMHM Upland Seasonal Habitat: (8.77 acres)
(Ruderal Grassland)

This map is representational only, and not meant for use in detailed design.



Map By: SG
Date: August 2013
Basemap: Terraserver 2004

Figure 2. (WRA 2013)



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Golden Eagle Refinery
WMU 31
Contra Costa County,
California

Figure 4.
WMU 31
Potential Salt Marsh
Harvest Mouse
Habitat

Bio-Oxidation
Pond

Clean Water Canal

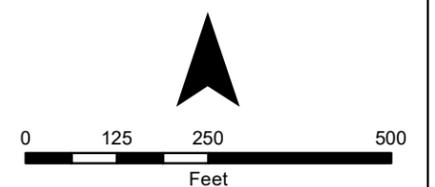
Surge Pond

Legend

-  Project Area: (50.44 acres)
-  WMU 31 Boundary
-  Pickleweed: (1.79 acres)
-  SMHM Seasonal Wetland Habitat: (14.78 acres)
(Disturbed Brackish Seasonal Wetland)
-  SMHM Upland Seasonal Habitat: (16.97 acres)
(Ruderal Grassland, Non-Native Grassland)

This map is representational only, and not meant for use in detailed design.

N



Map By: SG
Date: August 2013
Basemap: Terraserver 2004

Figure 3. (WRA 2013)

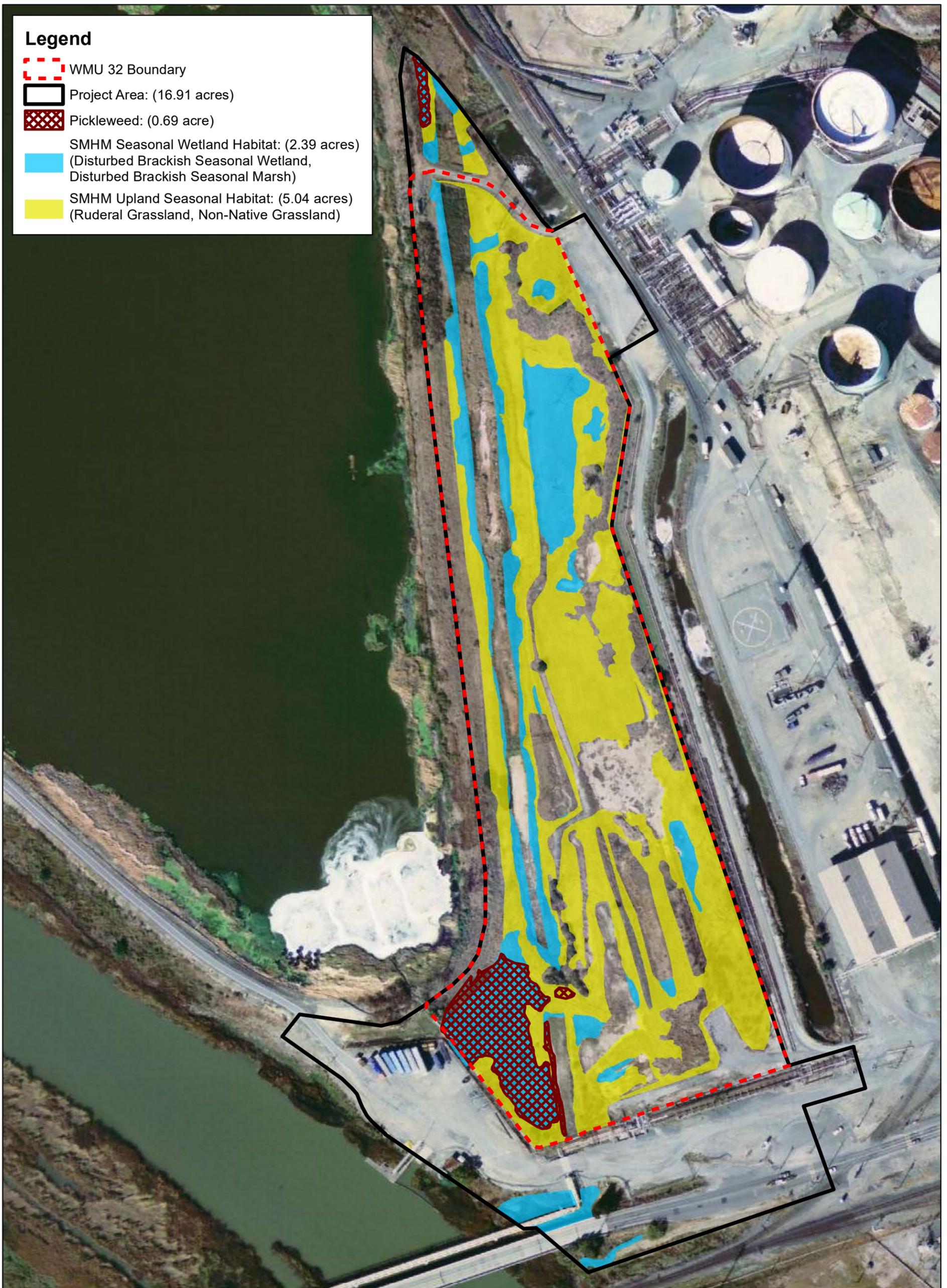
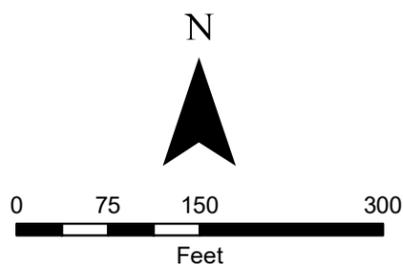


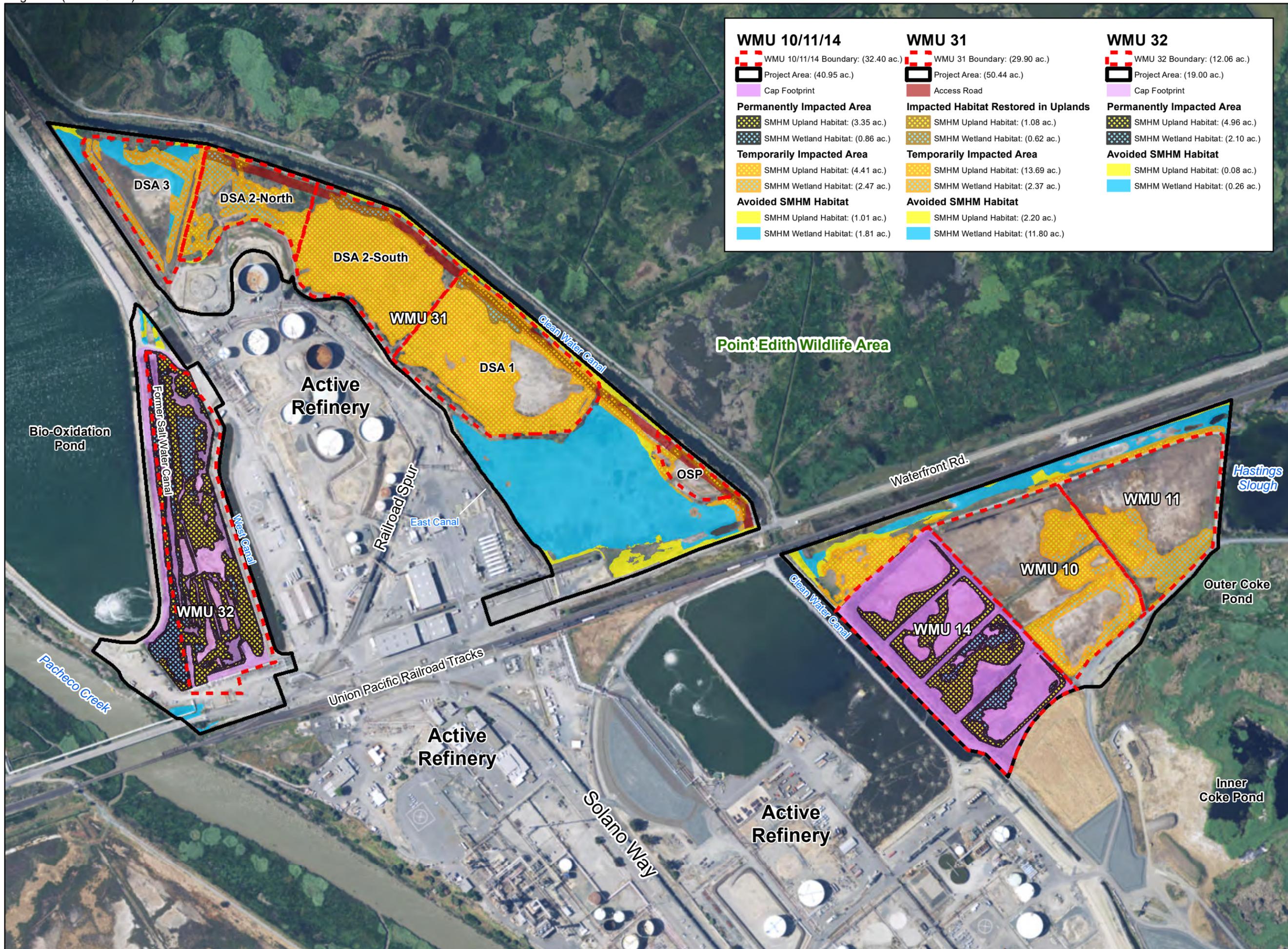
Figure 5. WMU 32 Potential Salt Marsh Harvest Mouse Habitat

WMU 32
Golden Eagle Refinery
Contra Costa County, California



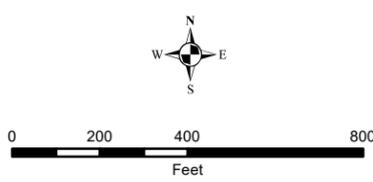
Map By: SG
Date: Nov 2013
Image Source: Terraserver 2004

Figure 4. (WRA 2017b)



Tesoro Martinez Refinery
 Tesoro Refining & Marketing Company LLC
 WMUs 10/11/14, 31, & 32
 Contra Costa County, California

Figure 3.
 Summary of Impacts to SMHM Habitat for WMUs 10/11/14, 31, & 32



Map By: SG
 Date: Sept 2016
 Image Source: ESRI Imagery

Figure 5.

From WRA 2013, Appendix A, Figures

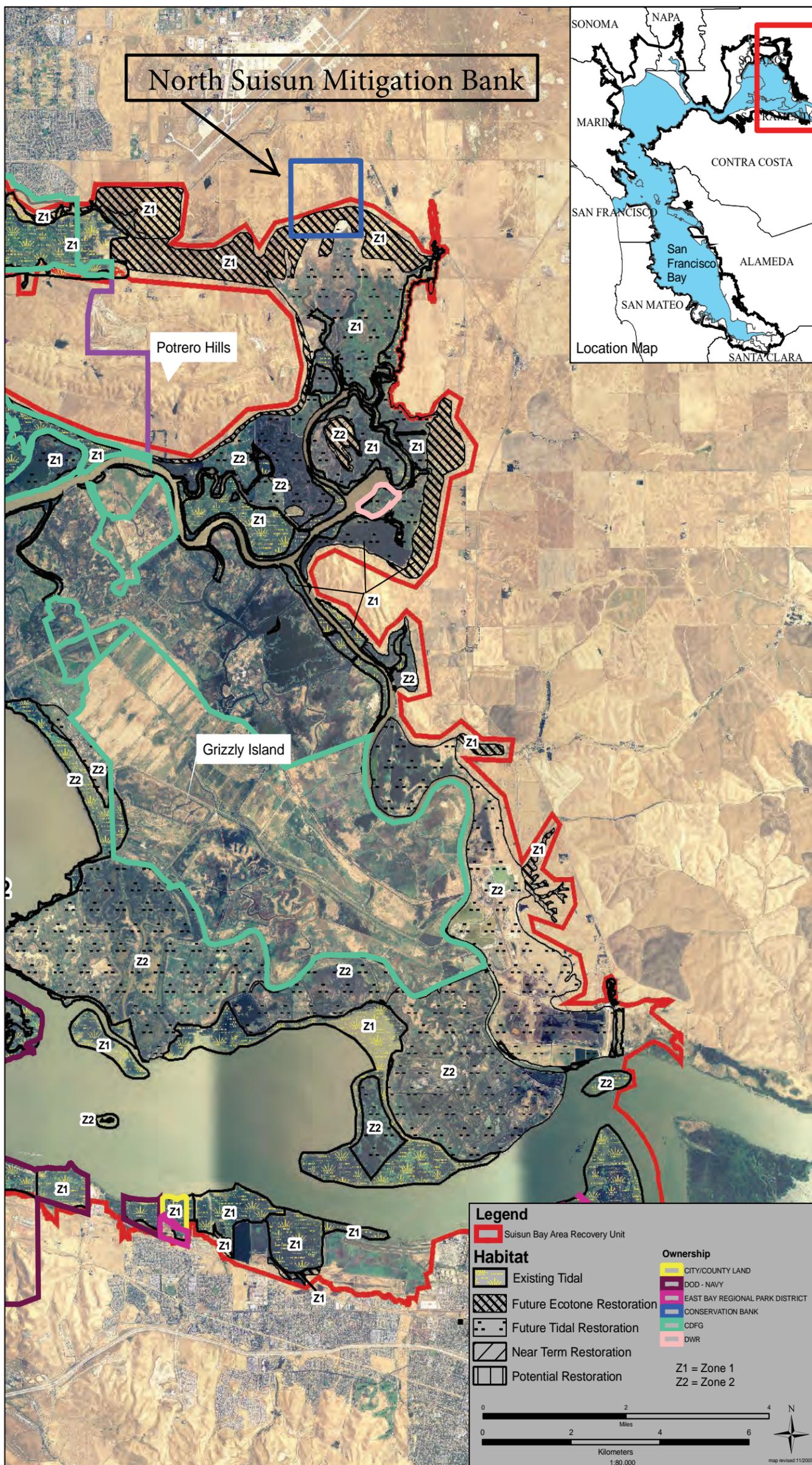


Figure 1. North Suisun Mitigation Bank Location within the Suisun Bay Area Recovery Unit

Tesoro Martinez Refinery
Contra Costa County,
California

- Approximate WMU Project Areas
- ✱ BUOW Observation
- WMUs 10/11/14 Rail Listening Stations
- WMU 31 Rail Listening Stations
- WMU 32/SW Tract 3 Rail Listening Stations

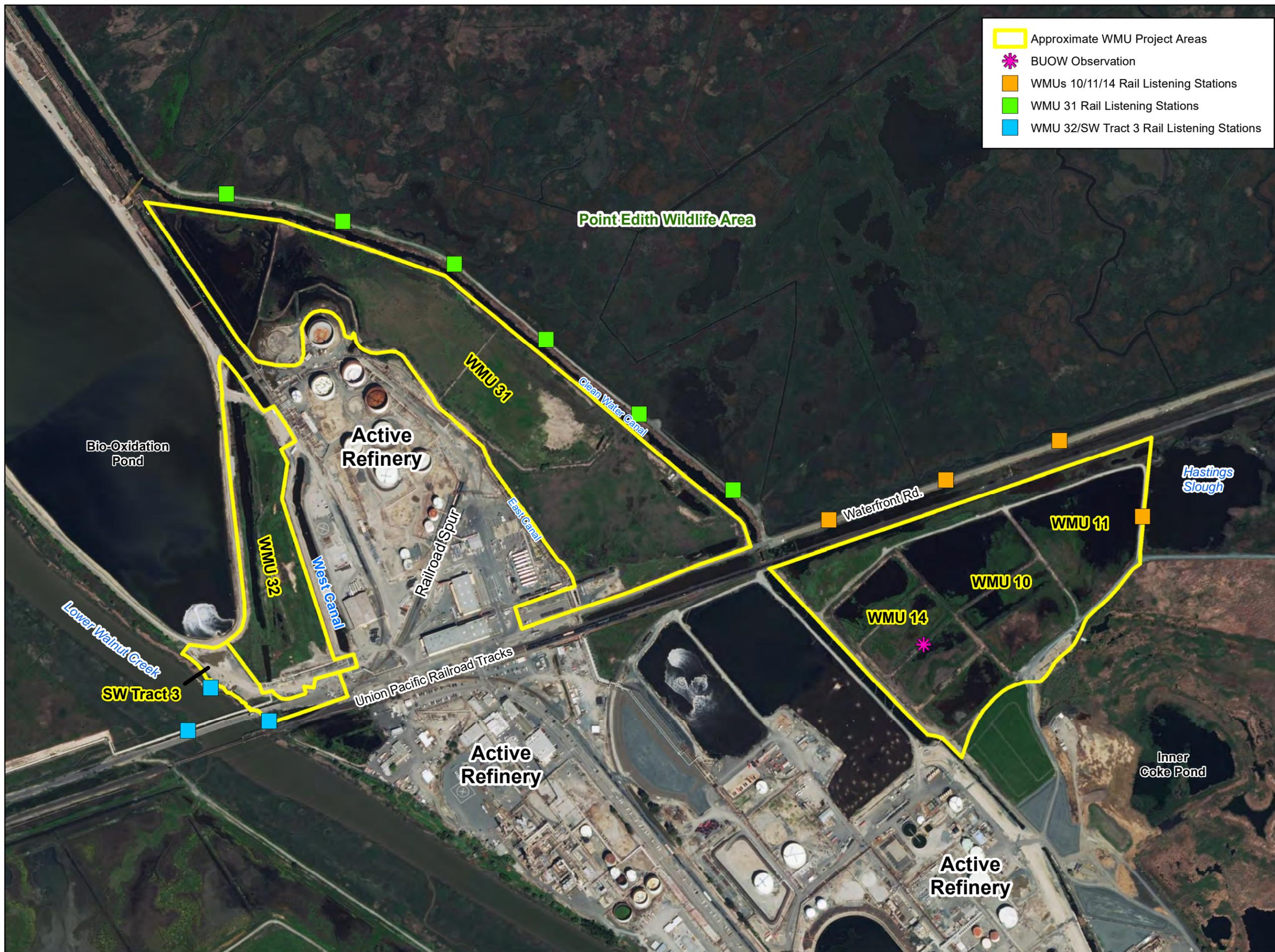
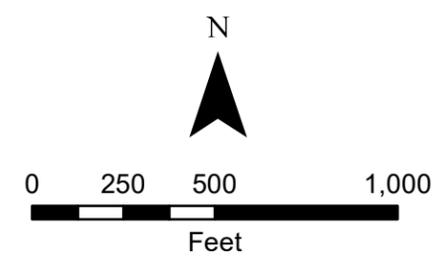


Figure 6.
WMUs 10/11/14, 31, & 32
Burrowing Owl
Observation



Tesoro Martinez Refinery
Contra Costa County,
California

- Approximate WMU Project Areas
- 2008 CBR Occurrences
- 2009 CBR Occurrences
- 2011 CBR Occurrences
- 2014 CBR Occurrences
- 2015 CBR Occurrences
- 2017 CBR Occurrences
- WMUs 10/11/14 Rail Listening Stations
- WMU 31 Rail Listening Stations
- WMU 32/SW Tract 3 Rail Listening Stations

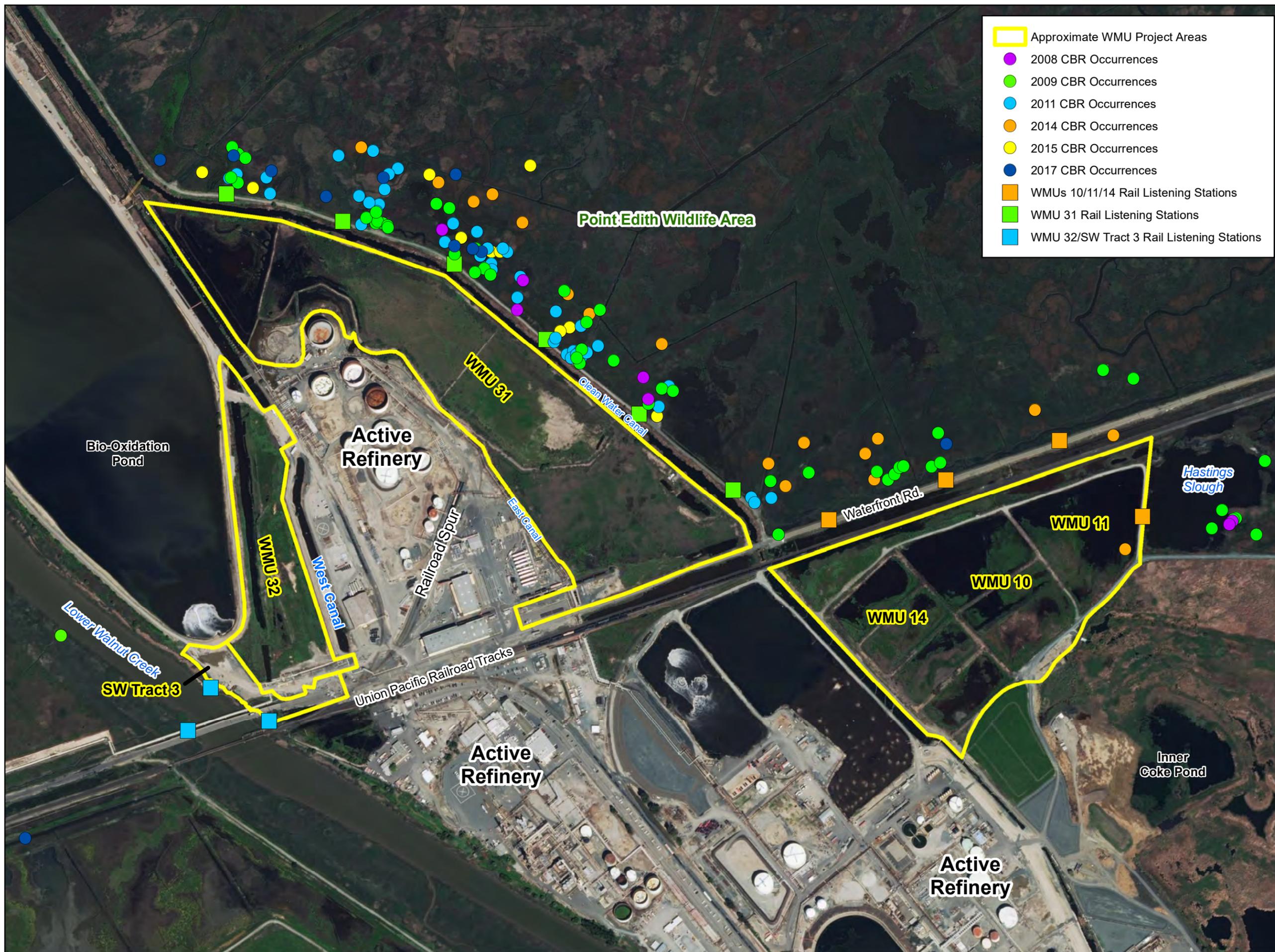
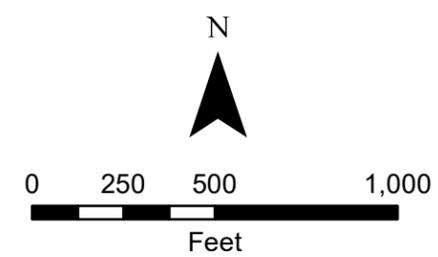


Figure 7.
WMUs 10/11/14, 31, & 32
California Black Rail
Detections



APPENDIX B – SPECIAL STATUS SPECIES SUMMARY TABLE

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Plants			
bent-flowered fiddleneck <i>Amsinckia lunaris</i>	Rank 1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. Elevation ranges from 10 to 1640 feet (3 to 500 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain coastal bluff scrub, cismontane woodland, and intact valley and foothill grassland. Likewise, this species is situated on rocky, colluvial or residual substrates, often derived from volcanic or ultramafic parent material; such substrates are absent from the Study Area, contemporarily and historically. Therefore, there is no potential for this species to occur within the Study Area.
California androsace <i>Androsace elongata ssp. acuta</i>	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, valley and foothill grassland. Elevation ranges from 490 to 3940 feet (150 to 1200 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain chaparral, coastal scrub, meadows and seeps, pinyon and juniper woodland, cismontane woodland, and intact, native valley and foothill grassland. Therefore, there is no potential for this species to occur within the Study Area.
slender silver moss <i>Anomobryum julaceum</i>	Rank 4.2	Broadleafed upland forest, lower montane coniferous forest, north coast coniferous forest/damp rock and soil on outcrops, usually on roadcuts. Elevation ranges from 330 to 3280 feet (100 to 1000 meters).	No Potential. The Study Area does not contain broadleafed upland forest, north coast coniferous forest/damp rock and soil on outcrops, roadcuts, and lower montane coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
coast rockcress <i>Arabis blepharophylla</i>	Rank 4.3	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub/rocky. Elevation ranges from 10 to 3610 feet (3 to 1100 meters). Blooms Feb-May.	No Potential. The Study Area does not contain broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub/rocky. This species occurs on bluff faces, rock crevices, and downhill talus of rock outcrops which are absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Mt. Diablo manzanita <i>Arctostaphylos auriculata</i>	Rank 1B.3	Chaparral (sandstone), cismontane woodland. Elevation ranges from 440 to 2130 feet (135 to 650 meters). Blooms Jan-Mar.	No Potential. The Study Area does not contain cismontane woodland or chaparral (sandstone). Therefore, there is no potential for this species to occur within the Study Area.
Contra Costa manzanita <i>Arctostaphylos manzanita ssp. laevigata</i>	Rank 1B.2	Chaparral (rocky). Elevation ranges from 1410 to 3610 feet (430 to 1100 meters). Blooms Jan-Mar (Apr).	No Potential. The Study Area does not contain chaparral (rocky). Therefore, there is no potential for this species to occur within the Study Area.
pallid manzanita <i>Arctostaphylos pallida</i>	FT, SE, Rank 1B.1	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub/siliceous shale, sandy or gravelly. Elevation ranges from 610 to 1530 feet (185 to 465 meters). Blooms Dec-Mar.	No Potential. The Study Area does not contain broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub/siliceous shale, sandy or gravelly. Therefore, there is no potential for this species to occur within the Study Area.
alkali milk-vetch <i>Astragalus tener var. tener</i>	Rank 1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools/alkaline. Elevation ranges from 0 to 200 feet (1 to 60 meters). Blooms Mar-Jun.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
heartscale <i>Atriplex cordulata var. cordulata</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy)/saline or alkaline. Elevation ranges from 0 to 1840 feet (0 to 560 meters). Blooms Apr-Oct.	Unlikely Potential. Although the Study Area contains seasonal wetlands and this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area. Furthermore, highly localized seed sources for colonization of the site are lacking.
crownscale <i>Atriplex coronata var. coronata</i>	Rank 4.2	Chenopod scrub, valley and foothill grassland, vernal pools/alkaline, often clay. Elevation ranges from 0 to 1940 feet (1 to 590 meters). Blooms Mar-Oct.	Moderate Potential. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
brittlescale <i>Atriplex depressa</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools/alkaline, clay. Elevation ranges from 0 to 1050 feet (1 to 320 meters). Blooms Apr-Oct.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area. Furthermore, highly localized seed sources for colonization of the site are lacking.
vernal pool smallscale <i>Atriplex persistens</i>	Rank 1B.2	Vernal pools (alkaline). Elevation ranges from 30 to 380 feet (10 to 115 meters). Blooms Jun-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from intact, alkali vernal pool and playa complexes. Highly localized seed sources to colonize the Study Area are lacking.
big-scale balsamroot <i>Balsamorhiza macrolepis</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/sometimes serpentine. Elevation ranges from 300 to 5100 feet (90 to 1555 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain woodland, chaparral, or rocky, serpentine/volcanic grassland in a hilly setting necessary to support this species.
big tarplant <i>Blepharizonia plumosa</i>	Rank 1B.1	Valley and foothill grassland/usually clay.. Elevation ranges from 100 to 1660 feet (30 to 505 meters). Blooms Jul-Oct.	Unlikely Potential. The Study Area does not contain intact naturally occurring grasslands underlain by clay substrates necessary to support this species.
Brewer's calandrinia <i>Calandrinia breweri</i>	Rank 4.2	Chaparral, coastal scrub/sandy or loamy, disturbed sites and burns. Elevation ranges from 30 to 4000 feet (10 to 1220 meters). Blooms (Jan), Mar-Jun.	No Potential. The Study Area does not contain scrub or chaparral habitat, nor does it contain recently burned areas.
round-leaved filaree <i>California macrophylla</i>	Rank 1B.2	Cismontane woodland, valley and foothill grassland/clay. Elevation ranges from 50 to 3940 feet (15 to 1200 meters). Blooms Mar-May.	No Potential. The Study Area does not contain cismontane woodland, valley and foothill grassland/clay. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo fairy-lantern <i>Calochortus pulchellus</i>	Rank 1B.2	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. Elevation ranges from 100 to 2760 feet (30 to 840 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral, riparian woodland, cismontane woodland, valley and foothill grassland. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Tiburon mariposa-lily <i>Calochortus tiburonensis</i>	FT, ST, Rank 1B.1	Valley and foothill grassland. On open, rocky, slopes in serpentine grassland. 50-150 m.	No potential. The Study Area does not contain valley and foothill grassland (Serpentine). Therefore, there is no potential for this species to occur within the Study Area.
Oakland star-tulip <i>Calochortus umbellatus</i>	Rank 4.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/often serpentine. Elevation ranges from 330 to 2300 feet (100 to 700 meters). Blooms Mar-May.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/ often serpentine. Therefore, there is no potential for this species to occur within the Study Area.
chaparral harebell <i>Campanula exigua</i>	Rank 1B.2	Chaparral (rocky, usually serpentine). Elevation ranges from 900 to 4100 feet (275 to 1250 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral (rocky, usually serpentine). Therefore, there is no potential for this species to occur within the Study Area.
Lyngbye's sedge <i>Carex lyngbye</i>	Rank 2B.2	Marshes and swamps (brackish or freshwater). 0-200 m.	Unlikely. The Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass) connected to open tidal or muted tidal activity (i.e., marsh plain). Nearest occurrence is 15 miles distant in Solano County on Rush Ranch (CDFW 2021) so seed sources are absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Tiburon paintbrush <i>Castilleja affinis var. neglecta</i>	FE, ST, Rank 1B.2	Valley and foothill grassland (serpentine). Elevation ranges from 200 to 1310 feet (60 to 400 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain valley and foothill grassland (serpentine). Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
johnny-nip <i>Castilleja ambigua var. ambigua</i>	Rank 4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pool margins. Elevation ranges from 0 to 1430 feet (0 to 435 meters). Blooms Mar-Aug.	No Potential. The Study Area does contain elements of salt marsh vegetation and is located adjacent to muted tidal channels. However, this species is commonly seen in freshwater seasonal marsh, intact vernal pool complex, or naturally occurring grassland habitats. The Study Area does not contain the necessary habitat to support this species.
holly-leaved ceanothus <i>Ceanothus purpureus</i>	Rank 1B.2	Chaparral, cismontane woodland/volcanic, rocky. Elevation ranges from 390 to 2100 feet (120 to 640 meters). Blooms Feb-Jun.	No Potential. The Study Area does not contain chaparral and cismontane woodland/volcanic (rocky). Therefore, there is no potential for this species to occur within the Study Area.
Congdon's tarplant <i>Centromadia parryi ssp. congdonii</i>	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 750 feet (0 to 230 meters). Blooms May-Oct (Nov).	High Potential. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area. Additionally, there are documented occurrences less than 0.5 mile distant from the Study Area that could provide a viable seed source.
pappose tarplant <i>Centromadia parryi ssp. parryi</i>	Rank 1B.2	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic)/often alkaline. Elevation ranges from 0 to 1380 feet (0 to 420 meters). Blooms May-Nov.	Moderate Potential. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Parry's rough tarplant <i>Centromadia parryi ssp. rudis</i>	Rank 4.2	Valley and foothill grassland, vernal pools/alkaline, vernal mesic, seeps, sometimes roadsides. Elevation ranges from 0 to 330 feet (0 to 100 meters). Blooms May-Oct.	Moderate Potential. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area.
hispid bird's-beak <i>Chloropyron molle ssp. hispidum</i>	Rank 1B.1	Meadows and seeps, playatas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 510 feet (1 to 155 meters). Blooms Jun-Sep.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is closely associated with intact alkali vernal pool-grassland complexes which are absent from the Study Area. Likewise, there is no localized seed sources for colonization of the site.
soft bird's-beak <i>Chloropyron molle ssp. molle</i>	FE, SR, Rank 1B.2	Marshes and swamps (coastal salt). Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms Jul-Nov.	Moderate Potential. The Study Area contains muted tidal channels that may support this species; however, these are extremely limited within the Study Area. This species was not observed during rare plant surveys conducted in the WMUs.
Bolander's water-hemlock <i>Cicuta maculata var. bolanderi</i>	Rank 2B.1	Marshes and swampscoastal, fresh or brackish water. Elevation ranges from 0 to 660 feet (0 to 200 meters). Blooms Jul-Sep.	High Potential. The Study Area contains wetland features with perennial hydrology or seasonally saturated emergent vegetation, specifically north of WMU 10/11/14. However, these areas are extremely limited within the units. Bolander's hemlock was not observed during rare plant surveys conducted in the WMUs.
Franciscan thistle <i>Cirsium andrewsii</i>	Rank 1B.2	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub/mesic, sometimes serpentine. Elevation ranges from 0 to 490 feet (0 to 150 meters). Blooms Mar-Jul.	No Potential. The Study Area does not contain broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub/mesic sometimes serpentine. Therefore, there is no potential for this species to occur within the Study Area.

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(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Suisun thistle <i>Cirsium hydrophilum var. hydrophilum</i>	FE, Rank 1B.1	Marshes and swamps (salt). Elevation ranges from 0 to 0 feet (0 to 1 meters). Blooms Jun-Sep.	Moderate Potential. The Study Area does contain elements of salt marsh vegetation and is located adjacent muted tidal channels that may support this species. This species occurs along steep man-made channels, and these are limited within the Study Area.
serpentine collomia <i>Collomia diversifolia</i>	Rank 4.3	Chaparral, cismontane woodland/serpentine, rocky or gravelly. Elevation ranges from 980 to 1970 feet (300 to 600 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Likewise, this species occurs on rocky, gravelly serpentine substrate that is absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo bird's-beak <i>Cordylanthus nidularius</i>	SR, Rank 1B.1	Chaparral (serpentine). Elevation ranges from 1970 to 2620 feet (600 to 800 meters). Blooms Jun-Aug.	No Potential. The Study Area does not contain chaparral. Likewise, this species is a serpentine endemic; serpentine substrate is absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.
Hospital Canyon larkspur <i>Delphinium californicum ssp. interius</i>	Rank 1B.2	Chaparral (openings), cismontane woodland (mesic), coastal scrub. Elevation ranges from 640 to 3590 feet (195 to 1095 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
western leatherwood <i>Dirca occidentalis</i>	Rank 1B.2	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland/mesic. Elevation ranges from 80 to 1390 feet (25 to 425 meters). Blooms Jan-Mar (Apr).	No Potential. The Study Area does not contain broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, or riparian woodland. Therefore, there is no potential for this species to occur within the Study Area.
dwarf downingia <i>Downingia pusilla</i>	Rank 2B.2	Valley and foothill grassland (mesic), vernal pools. Elevation ranges from 0 to 1460 feet (1 to 445 meters). Blooms Mar-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Small spikerush <i>Eleocharis parvula</i>	Rank 4.3	Marshes and swamps. Elevation ranges from 0 to 9910 feet (1 to 3020 meters). Blooms (Apr), Jun-Aug (Sep).	Unlikely. Although the Study Area does contain elements of marsh vegetation and is located adjacent muted tidal channels that may support this species. This species grows in undisturbed tidal habitat and the Study Area is entirely disturbed. Therefore the Study Area is unlikely to support this species.
Lime Ridge eriastrum <i>Eriastrum ertterae</i>	Rank 1B.1	Chaparral (openings or edges)/alkaline or semi-alkaline, sandy.. Elevation ranges from 660 to 950 feet (200 to 290 meters). Blooms Jun-Jul.	No Potential. The Study Area does not contain chaparral. Therefore, there is no potential for this species to occur within the Study Area.
streamside daisy <i>Erigeron biolettii</i>	Rank 3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest/rocky, mesic. Elevation ranges from 100 to 3610 feet (30 to 1100 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain broadleafed upland forest, cismontane woodland, or north coast coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
Tiburon buckwheat <i>Eriogonum luteolum var. caninum</i>	Rank 1B.2	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland/serpentine, sandy to gravelly. Elevation ranges from 0 to 2300 feet (0 to 700 meters). Blooms May-Sep.	No Potential. The Study Area does not contain coastal prairie, valley and foothill grassland/serpentine, chaparral, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo buckwheat <i>Eriogonum truncatum</i>	Rank 1B.1	Chaparral, coastal scrub, valley and foothill grassland/sandy. Elevation ranges from 10 to 1150 feet (3 to 350 meters). Blooms Apr-Sep (Nov), (Dec).	No Potential. The Study Area does not contain coastal scrub or chaparral, and the herbaceous communities are not intact native grassland. Furthermore, the Study Area substrate is not sandy.
Jepson's woolly sunflower <i>Eriophyllum jepsonii</i>	Rank 4.3	Chaparral, cismontane woodland, coastal scrub/sometimes serpentine. Elevation ranges from 660 to 3360 feet (200 to 1025 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral, cismontane woodland, or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Jepson's coyote thistle <i>Eryngium jepsonii</i>	Rank 1B.2	Vernal pools, valley and foothill grassland. Elevation range from 10 to 975 feet (3 to 300 meters). Blooms Apr-Aug.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Contra Costa wallflower <i>Erysimum capitatum var. angustatum</i>	FE, SE, Rank 1B.1	Inland dunes. Elevation ranges from 10 to 70 feet (3 to 20 meters). Blooms Mar-Jul.	No Potential. The Study Area does not contain aeolian or inland dune habitat necessary to support this species. This species is highly restricted to the Antioch Dunes.
San Joaquin sparscale <i>Extriplex joaquinana</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 2740 feet (1 to 835 meters). Blooms Apr-Oct.	Moderate. Although the Study Area does not contain intact playa or alkali grassland, this species is somewhat tolerant of disturbance and there is a seed source approximately one mile distant.
minute pocket moss <i>Fissidens pauperculus</i>	Rank 1B.2	North coast coniferous forest (damp coastal soil). Elevation ranges from 30 to 3360 feet (10 to 1024 meters).	No Potential. The Study Area does not contain north coast coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
fragrant fritillary <i>Fritillaria liliacea</i>	Rank 1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland/often serpentine. Elevation ranges from 10 to 1350 feet (3 to 410 meters). Blooms Feb-Apr.	No Potential. The Study Area does not contain woodland, prairie, scrub, or intact, native grassland habitat. Furthermore, this species is known from undisturbed rocky, clay substrates derived from volcanics or serpentine.
Toren's grimmia <i>Grimmia torenii</i>	Rank 1B.3	Chaparral, cismontane woodland, lower montane coniferous forest/openings, rocky, boulder and rock walls, carbonate, volcanic. Elevation ranges from 1070 to 3810 feet (325 to 1160 meters).	No Potential. The Study Area does not contain chaparral lower montane coniferous forest, rocky, boulders, rock walls, carbonate, or volcanic rock. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Diablo helianthella <i>Helianthella castanea</i>	Rank 1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland/usually rocky, axonal soils. often in partial shade. Elevation ranges from 200 to 4270 feet (60 to 1300 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, coastal scrub, valley and foothill grassland/ rocky, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Brewer's western flax <i>Hesperolinon breweri</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/usually serpentine. Elevation ranges from 100 to 3100 feet (30 to 945 meters). Blooms May-Jul.	No Potential. The Study Area does not contain chaparral, valley and foothill grassland/ usually serpentine, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Santa Cruz tarplant <i>Holocarpha macradenia</i>	FT, SE, Rank 1B.1	Coastal prairie, coastal scrub, valley and foothill grassland/often clay, sandy. Elevation ranges from 30 to 720 feet (10 to 220 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain coastal prairie, coastal scrub, valley and foothill grassland/often clay, or sandy. Therefore, there is no potential for this species to occur within the Study Area.
coast iris <i>Iris longipetala</i>	Rank 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps/mesic. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms Mar-May.	No Potential. The Study Area does not contain coastal prairie, lower montane coniferous forest, meadows, and seeps. Therefore, there is no potential for this species to occur within the Study Area.
Carquinez goldenbush <i>Isocoma arguta</i>	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 70 feet (1 to 20 meters). Blooms Aug-Dec.	No Potential. The Study Area does not contain undisturbed, intact, native alkali grasslands necessary to support this species.
Southern California black walnut <i>Juglans californica</i>	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland/alluvial. Elevation ranges from 160 to 2950 feet (50 to 900 meters). Blooms Mar-Aug.	No Potential. The Study Area does not contain chaparral, cismontane woodland, coastal scrub, or riparian woodland/alluvial. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Contra Costa goldfields <i>Lasthenia conjugens</i>	FE, Rank 1B.1	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools/mesic. Elevation ranges from 0 to 1540 feet (0 to 470 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Ferris' goldfields <i>Lasthenia ferrisiae</i>	Rank 4.2	Vernal pools (alkaline, clay). Elevation ranges from 70 to 2300 feet (20 to 700 meters). Blooms Feb-May.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Coulter goldfields <i>Lasthenia glabrata ssp. coulteri</i>	Rank 1B.1	alkaline soils in playas, sinks, grasslands, marshes, swamps, and vernal pools at elevations ranging from 0 to 4000 feet. Blooms Feb-June	Unlikely Potential. Soils, seasonal wetlands and grasslands in Study Area are disturbed. Assesed due to an unconfirmed occurrence of this species was documented by Z. Akulova near Walnut Creek, east of Martinez in 2009 (CalPhotos 2016).
Delta tule pea <i>Lathyrus jepsonii var. jepsonii</i>	Rank 1B.2	Marshes and swamps (freshwater and brackish). Elevation ranges from 0 to 20 feet (0 to 5 meters). Blooms May-Jul (Aug), (Sep).	Unlikely. The Study Area is adjacent to tidal areas that may support this species; however, these are absent within the Study Area and there is significant disturbance in the Study Area.
legenere <i>Legenere limosa</i>	Rank 1B.1	Vernal pools. Elevation ranges from 0 to 2890 feet (1 to 880 meters). Blooms Apr-Jun.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Jepson's leptosiphon <i>Leptosiphon jepsonii</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland. Open to partially shaded grassy slopes. On volcanics or the periphery of serpentine substrates. 55-855 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
woolly-headed lessingia <i>Lessingia hololeuca</i>	Rank 3	Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland/clay, serpentine. Elevation ranges from 50 to 1000 feet (15 to 305 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain scrub, forest, or intact, undisturbed grassland necessary to support this species. Furthermore, the Study Area does not contain serpentine clay substrate.
Mason's lilaepsis <i>Lilaeopsis masonii</i>	SR, Rank 1B.1	Marshes and swamps (brackish or freshwater), riparian scrub. Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms Apr-Nov.	Unlikely Potential. Although the Study Area contains elements of marsh habitat and muted tidal influence, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs with direct tidal action.
Delta mudwort <i>Limosella australis</i>	Rank 2B.1	Marshes and swamps (freshwater or brackish), riparian scrub/usually mud banks. Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms May-Aug.	Unlikely Potential. Although the Study Area contains elements of marsh habitat and muted tidal influence, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs and mud flats with direct tidal action.
Showy golden madia <i>Madia radiata</i>	Rank 1B.1	Valley and foothill grassland, cismontane woodland. Mostly on adobe clay in grassland or among shrubs. 75-1220 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
Hall's bush-mallow <i>Malacothamnus hallii</i>	Rank 1B.2	Chaparral, coastal scrub. Elevation ranges from 30 to 2490 feet (10 to 760 meters). Blooms May-Sep (Oct).	No Potential. The Study Area does not contain chaparral or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Oregon meconella <i>Meconella oregana</i>	Rank 1B.1	Coastal prairie, coastal scrub. Elevation ranges from 820 to 2030 feet (250 to 620 meters). Blooms Mar-Apr.	No Potential. The Study Area does not contain chaparral or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo cottonweed <i>Micropus amphibolus</i>	Rank 3.2	Broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland/rocky. Elevation ranges from 150 to 2710 feet (45 to 825 meters). Blooms Mar-May.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, valley and foothill grassland/rocky, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
marsh microseris <i>Microseris paludosa</i>	Rank 1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. Elevation ranges from 20 to 1160 feet (5 to 355 meters). Blooms Apr-Jun (Jul).	No Potential. The Study Area does not contain closed-cone coniferous forest, undisturbed valley and foothill grassland, coastal scrub, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
San Antonio Hills monardella <i>Monardella antonina ssp. antonina</i>	Rank 3	Chaparral, cismontane woodland. Elevation ranges from 1050 to 3280 feet (320 to 1000 meters). Blooms Jun-Aug.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
woodland woollythreads <i>Monolopia gracilens</i>	Rank 1B.2	Broadleafed upland forest (openings), chaparral (openings), cismontane woodland, north coast coniferous forest (openings), valley and foothill grassland/serpentine. Elevation ranges from 330 to 3940 feet (100 to 1200 meters). Blooms (Feb), Mar-Jul.	No Potential. The Study Area does not contain north coast coniferous forest, broadleafed upland forest, chaparral, undisturbed valley and foothill grassland, or cismontane woodland. Furthermore, the Study Area lacks serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
little mousetail <i>Myosurus minimus ssp. apus</i>	Rank 3.1	Valley and foothill grassland, vernal pools (alkaline). Elevation ranges from 70 to 2100 feet (20 to 640 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Lime Ridge navarretia <i>Navarretia gowenii</i>	Rank 1B.1	Chaparral. Elevation ranges from 590 to 1000 feet (180 to 305 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral. Therefore, there is no potential for this species to occur within the Study Area.
Baker's navarretia <i>Navarretia leucocephala ssp. bakeri</i>	Rank 1B.1	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 20 to 5710 feet (5 to 1740 meters). Blooms Apr-Jul.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Colusa grass <i>Neostapfia colusana</i>	FT, SE, Rank 1B.1	Vernal pools. Usually in the bottoms of large or deep vernal pools; adobe soils. 5-125 m.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Antioch Dunes evening-primrose <i>Oenothera deltooides ssp. howellii</i>	FE, SE, Rank 1B.1	Inland dunes. Elevation ranges from 0 to 100 feet (0 to 30 meters). Blooms Mar-Sep.	No Potential. The Study Area does not contain aeolian or inland dune habitat necessary to support this species. This species is highly restricted to the Antioch Dunes.
White-rayed pentachaeta <i>Pentachaeta bellidiflora</i>	FE, SE, Rank 1B.1	Valley and foothill grassland, cismontane woodland. Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 35-610 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo phacelia <i>Phacelia phacelioides</i>	Rank 1B.2	Chaparral, cismontane woodland/rocky. Elevation ranges from 1640 to 4490 feet (500 to 1370 meters). Blooms Apr-May.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
bearded popcornflower <i>Plagiobothrys hystriculus</i>	Rank 1B.1	Valley and foothill grassland (mesic), vernal poolsmargins/often vernal swales. Elevation ranges from 0 to 900 feet (0 to 274 meters). Blooms Apr-May.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Marin knotweed <i>Polygonum marinense</i>	Rank 3.1	Marshes and swamps (coastal salt or brackish). Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms (Apr), May-Aug (Oct).	Unlikely Potential. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass) and is located adjacent muted tidal channels that may support this species. This species grows in undisturbed tidal habitat and the Study Area is entirely disturbed. Therefore the Study Area is unlikely to support this species.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California alkali grass <i>Puccinellia simplex</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools/alkaline, vernal mesic; sinks, flats, and lake margins. Elevation ranges from 10 to 3050 feet (2 to 930 meters). Blooms Mar-May.	Unlikely Potential. Although the Study Area contains seasonal wetlands which have a hydroperiod similar to vernal pools, this species is restricted to intact, interior alkali vernal pool complexes which are absent from the Study Area.
Lobb's aquatic buttercup <i>Ranunculus lobbii</i>	Rank 4.2	Cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms Feb-May.	No Potential. The Study Area does not contain north coast coniferous forest, valley and foothill grassland, vernal pools, or cismontane woodland. Restricted to freshwater pools of approximately six inches or greater in depth. Therefore, there is no potential for this species to occur within the Study Area.
rock sanicle <i>Sanicula saxatilis</i>	SR, Rank 1B.2	Broadleafed upland forest, chaparral, valley and foothill grassland/rocky. Elevation ranges from 2030 to 3850 feet (620 to 1175 meters). Blooms Apr-May.	No Potential. The Study Area does not contain broadleafed upland forest, undisturbed grassland, or chaparral. Furthermore, the Study Area does not contain rocky substrates necessary to support this species. Therefore, there is no potential for this species to occur within the Study Area.
chaparral ragwort <i>Senecio aphanactis</i>	Rank 2B.2	Chaparral, cismontane woodland, coastal scrub/sometimes alkaline. Elevation ranges from 50 to 2620 feet (15 to 800 meters). Blooms Jan-Apr.	No Potential. The Study Area does not contain north coast coniferous forest, undisturbed valley and foothill grassland, vernal pools, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
long-styled sand-spurrey <i>Spergularia macrotheca var. longistyla</i>	Rank 1B.2	Alkali seasonal marshes, mud flats, alkali meadows, and alkali hot springs. Elevation ranges from 0 to 830 feet (0 to 255 meters). Blooms Feb-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is closely associated with intact, highly alkali habitats absent from the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
most beautiful jewelflower <i>Streptanthus albidus ssp. peramoenus</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/serpentine. Elevation ranges from 310 to 3280 feet (95 to 1000 meters). Blooms (Mar), Apr-Sep (Oct).	No Potential. The Study Area does not contain chaparral, valley and foothill grassland, or cismontane woodland. The Study Area does not contain serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo jewelflower <i>Streptanthus hispidus</i>	Rank 1B.3	Chaparral, valley and foothill grassland/rocky. Elevation ranges from 1200 to 3940 feet (365 to 1200 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain chaparral, valley and foothill grassland, or cismontane woodland. The Study Area does not contain serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
slender-leaved pondweed <i>Stuckenia filiformis ssp. alpina</i>	Rank 2B.2	Marshes and swamps (assorted shallow freshwater). Elevation ranges from 980 to 7050 feet (300 to 2150 meters). Blooms May-Jul.	Unlikely. Although the Study Area contains muted tidal channels, the brackish water likely precludes the presence of this submerged, freshwater species.
California seablite <i>Suaeda californica</i>	FE, Rank 1B.1	Marshes and swamps. Margins of coastal salt marshes. 0-5 m.	Unlikely. The Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass) connected to open tidal or muted tidal activity (i.e., marsh plain). Closest documented occurrence is 18 miles away near the City of Richmond, last seen in 1912 and presumed extirpated (CDFW 2021). Extant occurrences 25 miles distant (CDFW 2021) so seed sources are absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area. This species was not observed during rare plant surveys conducted in muted tidal habitat in the Study Area associated with WMU 10/11/14.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Suisun Marsh aster <i>Symphyotrichum lentum</i>	Rank 1B.2	Marshes and swamps (brackish and freshwater). Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms (Apr), May-Nov.	High Potential. The Study Area contains brackish marsh habitat that may support this species. Additionally, this species is relatively tolerant of disturbance. however, these are extremely limited within the Study Area. Likewise, there are documented extant occurrences less than 0.5 mile distant from the Study Area.
saline clover <i>Trifolium hydrophilum</i>	Rank 1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Elevation ranges from 0 to 980 feet (0 to 300 meters). Blooms Apr-Jun.	Unlikely Potential. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
coastal triquetrella <i>Triquetrella californica</i>	Rank 1B.2	Coastal bluff scrub, coastal scrub/soil. Elevation ranges from 30 to 330 feet (10 to 100 meters).	No Potential. The Study Area does not contain coastal bluff scrub and coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
caper-fruited tropidocarpum <i>Tropidocarpum capparideum</i>	Rank 1B.1	Valley and foothill grassland (alkaline hills). Elevation ranges from 0 to 1490 feet (1 to 455 meters). Blooms Mar-Apr.	No Potential. The Study Area does not contain alkali hilly grasslands necessary to support this species. Therefore, there is no potential for this species to occur within the Study Area.
oval-leaved viburnum <i>Viburnum ellipticum</i>	Rank 2B.3	Chaparral, cismontane woodland, lower montane coniferous forest. Elevation ranges from 710 to 4590 feet (215 to 1400 meters). Blooms May-Jun.	No Potential. The Study Area does not contain lower montane coniferous forest, chaparral, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Mammals			

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
pallid bat <i>Antrozous pallidus</i>	SSC, WBWG	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, forages along river channels. Roost sites include crevices in rocky outcrops and cliffs, caves, mines, trees and various human structures such as bridges, barns, and buildings (including occupied buildings). Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Unlikely Potential. The Study Area does not contain any large trees with cavities or undisturbed buildings to support roosting. This species may be observed foraging within the Study Area, but it is unlikely to roost there. The nearest documented occurrence is four miles from the Study Area (CDFW 2017).
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	SSC, WBWG	This species is associated with a wide variety of habitats from deserts to mid-elevation mixed coniferous-deciduous forest. Females form maternity colonies in buildings, caves and mines and males roost singly or in small groups. Foraging occurs in open forest habitats where they glean moths from vegetation.	Unlikely Potential. This species is sensitive to disturbance and no caves, mines, or other undisturbed, suitable roost habitat is present in the Study Area or vicinity. The Study Area does not contain the forested communities this species prefers. The nearest documented occurrence is 6.5 miles from the Study Area (CDFW 2017).
western red bat <i>Lasiurus blossevillii</i>	SSC, WBWG	This species is typically solitary, roosting primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).	Unlikely Potential. The Study Area does not contain riparian habitat with large trees to support roosting for this species. This species may be observed foraging within the Study Area, but it is unlikely to roost there.
hoary bat <i>Lasiurus cinereus</i>	WBWG	Prefers open forested habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths.	Unlikely Potential. The Study Area does not contain riparian habitat with large trees to support roosting for this species. This species may be observed foraging within the Study Area, but it is unlikely to roost there.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
big free-tailed bat <i>Nyctinomops macrotis</i>	SSC, WBWG	Occurs rarely in low-lying arid areas. Requires high cliffs or rocky outcrops for roosting sites.	Unlikely Potential. No cliffs or other suitable roost habitat are present within the Study Area or vicinity. The Study Area is outside this species known range, and although there is a documented occurrence within 3.8 miles of the Study Area, this occurrence is considered vagrant.
American badger <i>Taxidea taxus</i>	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Requires friable soils and open, uncultivated ground. Preys on burrowing rodents.	Unlikely Potential. The Study Area is an industrial work area with frequent disturbance and no connectivity to known occupied or suitable open grassland habitats. The nearest documented occurrence is 12 miles southwest of the Study Area (CDFW 2017)
ringtail <i>Bassariscus astutus</i>	CFP	Widely distributed throughout most of California, absent from some portions of the Central Valley and northeastern California. Found in a variety of habitats including riparian areas, semi-arid country, deserts, chaparral, oak woodlands, pinyon pine woodlands, juniper woodlands and montane conifer forests usually under 4,600 ft. in elevation. Typically uses cliffs or large trees for shelter.	No Potential. The Study Area does not contain suitable woodland or chaparral habitat adjacent to freshwaters to support foraging or denning for this species.
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	SSC	Forest habitats of moderate canopy and moderate to dense understory. Also in chaparral habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	No Potential. The Study Area does not contain riparian or chaparral habitat to provide cover or material for nesting. The nearest documented occurrence is over seven miles south of the Study Area (CDFW 2017).
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	FE, ST	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	No Potential. The Study Area is east of the species' known range and does not contain connectivity to suitable open grassland habitat. The nearest documented occurrence is over 10 miles southeast of the Study Area (CDFW 2017).

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	FE, SE, CFP	Endemic to emergent salt and brackish wetlands of the San Francisco Bay Estuary. Pickleweed marshes are primary habitat; also occurs in various other wetland communities with dense vegetation. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	Moderate Potential. The Study Area contains marsh communities suitable for this species, most notably in the northern portion of the Study Area. Additionally, upland communities adjacent to marshes present within the Study Area may be used opportunistically for foraging by this species. The nearest documented occurrences are north of the Study Area in Point Edith Marsh and across Pacheco Creek west of the Study Area (CDFW 2017).
Suisun shrew <i>Sorex ornatus sinuosus</i>	SSC	Tidal marshes of the northern shores of San Pablo and Suisun Bays. Require dense low-lying cover and drift weed and other litter above the mean high tide line for nesting and foraging.	Unlikely. Although the Study Area is immediately adjacent to the Suisun Bay, it is located along the southern shores and therefore within the range of and does not provide habitat connectivity to support this subspecies. The nearest documented occurrence is over 5 miles north of Study Area, across Suisun Bay (CDFW 2017).
Birds			
golden eagle <i>Aquila chrysaetos</i>	CFP, BCC, EPA	Occurs year-round in rolling foothills, mountain areas, sage-juniper flats, and deserts. Cliff-walled canyons provide nesting habitat in most parts of range; also nests in large trees, usually within otherwise open areas.	Unlikely Potential. The Study Area does not contain canyons of cliffs or large trees to support nesting of this species. The nearest documented nesting occurrence is six miles north of the Study Area (CDFW 2017). This species may occasionally forage within the Study Area.
bald eagle <i>Haliaeetus leucocephalus</i>	FD, SE, CFP, BCC, EPA	Occurs year-round in California, but primarily a winter visitor. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	Unlikely Potential. The Study Area does not contain large trees to support nesting of this species. The nearest documented nesting occurrence is over 11 miles west of the Study Area (CDFW 2017). This species may occasionally forage within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
northern harrier <i>Circus cyaneus</i>	SSC	Year-round resident and winter visitor. Found in open habitats including grasslands, prairies, marshes and agricultural areas. Nests on the ground in dense vegetation, typically near water or otherwise moist areas. Preys on small vertebrates.	Present. The Study Area provides some open foraging habitat for this species, and northern portions of the Study Area containing low wetland vegetation are suitable for nesting.
white-tailed kite <i>Elanus leucurus</i>	CFP	Year-round resident in coastal and valley lowlands with scattered trees and large shrubs, including grasslands, marshes and agricultural areas. Nests in trees, of which the type and setting are highly variable. Preys on small mammals and other vertebrates.	Moderate Potential. The Study Area contains open grassland habitat to provide foraging, but there are no suitably large trees and shrubs to support nesting in and around the Study Area.
American peregrine falcon <i>Falco peregrinus anatum</i>	FD, SD, CFP, BCC	Year-round resident and winter visitor. Occurs in a wide variety of habitats, though often associated with coasts, bays, marshes and other bodies of water. Nests on protected cliffs and also on man-made structures including buildings and bridges. Preys on birds, especially water birds. Forages widely.	Unlikely Potential. The Study Area does not contain suitable elevated nesting structures such as cliffs or tall buildings. This species may occasionally pass through the Study Area but it is unlikely to nest there.
prairie falcon <i>Falco mexicanus</i>	BCC	Year-round resident and winter visitor. Inhabits dry, open terrains, including foothills and valleys. Breeding sites located on steep cliffs. Forages widely.	Unlikely Potential. The Study Area does not contain steep cliffs or open valleys to support breeding by this species.
ferruginous hawk <i>Buteo regalis</i>	BCC	Winter visitor to open habitats, including grasslands, sagebrush flats, scrub, and low foothills surrounding valleys. Preys on mammals. Does not breed in California.	Unlikely Potential. The species does not breed in the region, but may be observed foraging within the Study Area during the non-breeding season.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Swainson's hawk <i>Buteo swainsoni</i>	ST, BCC	Summer resident in California's Central Valley and limited portions of the southern California interior. Nests in tree groves and isolated trees in riparian and agricultural areas, including near buildings. Forages in grasslands and scrub habitats as well as agricultural fields, especially alfalfa. Preys on arthropods year-round as well as smaller vertebrates during the breeding season.	Unlikely Potential. Although the Study Area contains open grasslands typical to support foraging, the Study Area does not contain large trees suitable for nesting. The nearest documented occurrence is over 10 miles east of the Study Area (CDFW 2017).
burrowing owl <i>Athene cunicularia</i>	SSC, BCC	Year-round resident and winter visitor. Occurs in open, dry grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, most commonly those of ground squirrels.	Moderate Potential. Much of the Study Area contains bare ground or short vegetation, and there are some burrows in these areas suitable for occupation by this species. The nearest documented occurrence is 1.2 miles south of the Study Area (CDFW 2017).
short-eared owl <i>Asio flammeus</i>	SSC	Occurs year-round, but primarily as a winter visitor; breeding very restricted in most of California. Found in open, treeless areas (e.g., marshes, grasslands) with elevated sites for foraging perches and dense herbaceous vegetation for roosting and nesting. Preys mostly on small mammals, particularly voles.	Unlikely Potential. This species is a rare nester in the region, and disturbance regimens within the Study Area reduce the potential for nesting by this species. The nearest documented nesting occurrence is 10 miles east of the Study Area (CDFW 2017).
long-eared owl <i>Asio otus</i>	SSC	Occurs year-round in California. Nests in trees in a variety of woodland habitats, including oak and riparian, as well as tree groves. Requires adjacent open land with rodents for foraging, and the presence of old nests of larger birds (hawks, crows, magpies) for breeding.	Unlikely Potential. This species is rare in the region and has not been documented in the vicinity (Glover 2009, CDFW 2017). In addition, the Study Area does not contain riparian or woodland communities to support nesting.
Northern spotted owl <i>Strix occidentalis caurina</i>	FT, ST	Year-round resident in dense, structurally complex coniferous and mixed (coniferous-hardwood) forests, usually those with old-growth conifers. Nests on platform-like substrates in the forest canopy, including in tree cavities. Preys on mammals.	No Potential. The Study Area does not contain suitable coniferous or mixed forest habitat that this species requires.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
black oystercatcher <i>Haematopus bachmani</i>	BCC	Year-round resident of rocky coast habitats along the Pacific coast. Also occurs on coastal and lower estuarine mud-flats. Forages primarily on intertidal invertebrates.	No Potential. The Study Area does not contain mud-flats or coastal habitat. Suitable foraging habitat may be present along the shores of the Suisun Bay, 300 feet north of the Study Area.
California black rail <i>Laterallus jamaicensis coturniculus</i>	ST, CFP	Year-round resident in marshes (saline to freshwater) with dense vegetation within four inches of the ground. Prefers larger, undisturbed marshes that have an extensive upper zone and are close to a major water source. Extremely secretive and cryptic.	Unlikely. The Study Area lacks tidal flow and sloughs and provides only marginal habitat. However, tidal/brackish wetlands containing dense pickleweed vegetation are present near Study Area in Hastings Slough and across a railroad line and a road in Point Edith Wildlife Area. This species has been observed (CDFW 2017) in the Point Edith Wildlife Area. Black rails have been detected in Hastings Slough and in the Point Edith Wildlife Area during Study Area surveys. Pickleweed is present within the Study Area, but not large expanses suitable to support black rail or foraging habitat (tidal sloughs or other areas with dense veg). WRA has surveyed the Study Area in multiple years and has not detected black rails nesting within the Study Area.
California Ridgway's (clapper) rail <i>Rallus obsoletus obsoletus</i>	FE, SE, CFP	Year-round resident in tidal marshes of the San Francisco Bay estuary. Requires tidal sloughs and intertidal mud flats for foraging, and dense marsh vegetation for nesting and cover. Typical habitat features abundant growth of cordgrass and pickleweed. Feeds primarily on mollusks and crustaceans.	Unlikely. The Study Area lacks tidal flow and provides no suitable habitat. Tidal/brackish wetlands containing dense pickleweed vegetation are present near Study Area in Hastings Slough and across a railroad line and a road in Point Edith Wildlife Area, where this species has a documented occurrence (CDFW 2017). WRA has surveyed the Study Area for multiple years and has not detected rails nesting within the Study Area or Point Edith Wildlife Area or Hastings Slough.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California least tern <i>Sternula antillarum browni</i>	FE, SE, CFP	Summer resident along the coast from San Francisco Bay south to northern Baja California; inland breeding also very rarely occurs. Nests colonially on barren or sparsely vegetated areas with sandy or gravelly substrates near water, including beaches, islands, and gravel bars. In San Francisco Bay, has also nested on salt pond margins.	Unlikely Potential. The Study Area does not contain sheltered gravel nesting or foraging habitat for this species. This species may be observed foraging within the vicinity of the Study Area, along Suisun Bay.
western snowy plover <i>Charadrius nivosus</i> <i>(alexandrines) nivosus</i>	FT, SSC, BCC	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	Unlikely Potential. The Study Area does not contain beach, or shore habitat to support nesting or foraging of this species. The nearest suitable habitat is over 10 miles west towards the San Pablo Bay.
great blue heron <i>Ardea herodias</i>	none (breeding sites protected by CDFW)	Year-round resident. Nests colonially or semi-colonially in tall trees and on cliffs, also sequestered terrestrial substrates. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	Unlikely Potential. The Study Area does not contain trees suitable to support a nesting colony. Additionally there are no documented rookeries within the Study Area or immediately adjacent area (CDFW 2017). This species may be observed foraging within the Study Area.
great egret <i>Ardea alba</i>	none (breeding sites protected by CDFW)	Year-round resident. Nests colonially or semi-colonially, usually in trees, occasionally on the ground or elevated platforms. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	Unlikely Potential. The Study Area does not contain trees suitable to support a nesting colony. Additionally there are no documented rookeries within the Study Area or immediately adjacent area (CDFW 2017). This species may be observed foraging within the Study Area.
Allen's hummingbird <i>Selasphorus sasin</i>	BCC	Summer resident along the California coast, breeding in a variety of woodland and forest habitats, including parks and gardens with abundant nectar sources. Nest in shrubs and trees with dense vegetation.	Unlikely Potential. The Study Area does not provide suitable woodland or forest vegetation to support nesting or foraging for this species.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	FT, SE, BCC	Summer resident, breeding in dense riparian forests and jungles, typically with early successional vegetation present. Utilizes densely-foliaged deciduous trees and shrubs. Eats mostly caterpillars. Current breeding distribution within California very restricted.	No potential. The Study Area does not contain suitable riparian forest habitat required for nesting or foraging by this species.
olive-sided flycatcher <i>Contopus cooperi</i>	SSC, BCC	Summer resident. Typical breeding habitat is montane coniferous forests. At lower elevations, also occurs in wooded canyons and mixed forests and woodlands. Often associated with forest edges. Arboreal nest sites located well off the ground.	Unlikely Potential. This species is uncommon in the Delta and is more commonly found in the region in higher elevation portions of the coast ranges. Additionally, the Study Area does not contain forested communities to support nesting of this species.
bank swallow <i>Riparia riparia</i>	ST	Summer resident in riparian and other lowland habitats near rivers, lakes and the ocean in northern California. Nests colonially in excavated burrows on vertical cliffs and bank cuts (natural and manmade) with fine-textured soils. Historical nesting range in southern and central areas of California has been eliminated by habitat loss. Currently known to breed in Siskiyou, Shasta, and Lassen Cos., portions of the north coast, and along Sacramento River from Shasta Co. south to Yolo Co.	No Potential. The Study Area and vicinity do not contain suitable riparian bank habitat for this species. The Study Area is outside the current known breeding range.
Nuttall's woodpecker <i>Picoides nuttallii</i>	BCC	Year-round resident in lowland woodlands throughout much of California west of the Sierra Nevada. Typical habitat is dominated by oaks; also occurs in riparian woodland. Nests in tree cavities.	Unlikely Potential. The Study Area and immediately adjacent do not contain woodland trees with cavities suitable to support nesting or foraging of this species.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Lewis's woodpecker <i>Melanerpes lewis</i>	BCC	Uncommon resident in California occurring on open oak savannahs, broken deciduous and coniferous habitats. Breeds primarily in ponderosa pine forests, riparian woodlands and disturbed pine forests but is also known to nest in orchards and oak woodlands. Rare nester in the San Francisco Bay Area.	Unlikely Potential. The Study Area and immediately adjacent do not contain trees suitable to support nesting or foraging of this species. This species predominately winters in the San Francisco Bay Area.
loggerhead shrike <i>Lanius ludovicianus</i>	BCC, SSC	Year-round resident in open woodland, grassland, savannah and scrub. Prefers areas with sparse shrubs, trees, posts, and other suitable perches for foraging. Preys upon large insects and small vertebrates. Nests are well-concealed in densely-foliaged shrubs or trees.	Unlikely Potential. Although grassland foraging habitat is present within the Study Area, there are few shrubs or dense trees to support nesting.
oak titmouse <i>Baeolophus inornatus</i>	BCC	Occurs year-round in woodland and savannah habitats where oaks are present, as well as riparian areas. Nests in tree cavities.	Unlikely Potential. The Study Area and immediately adjacent do not contain woodland trees with cavities suitable to support nesting or foraging of this species.
yellow warbler <i>Setophaga (Dendroica) petechia brewsteri</i>	SSC, BCC	Summer resident throughout much of California. Breeds in riparian vegetation close to water, including streams and wet meadows. Microhabitat used for nesting variable, but dense willow growth is typical. Occurs widely on migration.	Unlikely Potential. The Study Area and immediately adjacent areas do not contain riparian trees to support foraging or nesting by this species.
black-chinned sparrow <i>Spizella atrogularis</i>	BCC	Summer resident. Typically occurs on arid, rocky slopes with brushy vegetation, e.g. mixed chaparral and sagebrush.	Unlikely Potential. The Study Area and immediately adjacent areas do not contain chaparral or scrub habitat to support nesting or foraging of this species.
grasshopper sparrow <i>Ammodramus savannarum</i>	SSC	Summer resident. Breeds in open grasslands in lowlands and foothills, generally with low- to moderate-height grasses and scattered shrubs. Well-hidden nests are placed on the ground.	Unlikely Potential. The Study Area and immediately adjacent areas do not contain undisturbed grassland habitat to support nesting or foraging of this species. This species is predominately found in the Coast Range hills in the region.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Samuels (San Pablo) song sparrow <i>Melospiza melodia samuelis</i>	BCC, SSC	Year-round resident of tidal marshes along the north side of San Francisco and San Pablo Bays. Typical habitat is dominated by pickleweed, with gumplant and other shrubs present in the upper zone for nesting. May forage in areas adjacent to marshes.	No Potential. The Study Area is outside of the subspecies' known range.
Suisun song sparrow <i>Melospiza melodia maxillaris</i>	BCC, SSC	Year-round resident of brackish-water marshes along Suisun Bay. Inhabits cattails, tules, bulrushes and other emergent vegetation, including pickleweed. Nests typically placed in shrubs.	Present. Wetland emergent vegetation to support nesting and foraging of this species is present within the Study Area. This species is known from the vicinity and presumably present in wetland areas adjacent to the Study Area.
Lawrence's goldfinch <i>Spinus lawrencei</i>	BCC	Summer resident, primarily in southern California; generally uncommon and local. Typically found in arid open woodlands, including oak savannah. Breeding distribution is erratic from year to year.	Unlikely Potential. This species typically inhabits open woodlands and oak savannah. Vegetation to support nesting and foraging of this species is not present within the Study Area.
tricolored blackbird <i>Agelaius tricolor</i>	SSC, BCC	Nearly endemic to California, where it is most numerous in the Central Valley and vicinity. Highly colonial, nesting in dense aggregations over or near freshwater in emergent growth or riparian thickets. Also uses flooded agricultural fields. Abundant insect prey near breeding areas essential.	Unlikely Potential. The Study Area contains areas of inundation, but not the tall dense marsh vegetation that may support nesting of this species. This species has been documented within two miles west of the Study Area.
saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	BCC, SSC	Resident of the San Francisco Bay region, in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	Moderate Potential. The Study Area contains areas of inundation and associated marsh vegetation that may support nesting of this species. This species is known from the vicinity and is presumably present in wetland areas adjacent to the Study Area.
yellow-billed magpie <i>Pica nuttalli</i>	BCC	Endemic to the Central Valley and central Coast Ranges. Favors open park-like areas with expanses of open ground, including oak savannah, orchards, and along stream courses. Large, dome-shaped stick nests are placed in trees.	Unlikely Potential. The Study Area does not contain woodland communities suitable for nesting. This species may be occasionally observed foraging within the Study Area.
Reptiles and Amphibians			

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	FT, ST	Inhabits chaparral and foothill-hardwood habitats in the eastern Bay Area. Prefers south-facing slopes and ravines with rock outcroppings where shrubs form a vegetative mosaic with oak trees and grasses and small mammal burrows provide basking and refuge.	No Potential. The Study Area is outside of the species' known range and does not contain suitable scrub or woodland habitat.
giant garter snake <i>Thamnophis gigas</i>	FT, ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	No Potential. The Study Area is west of this species' known range and does not contain suitable freshwater habitat.
Foothill yellow-legged frog <i>Rana boylei</i>	SE, SSC	Found in or adjacent to rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented occurrence is five miles southwest of the Study Area (CDFW 2021).
California red-legged frog <i>Rana draytonii</i>	FT, SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Associated with quiet perennial to intermittent ponds, stream pools and wetlands. Prefers shorelines with extensive vegetation. Disperses through upland habitats after rains.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented occurrence is four miles west of the Study Area (CDFW 2017)
California tiger salamander <i>Ambystoma californiense</i>	FE/FT, ST	Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and seasonal pool habitats. Adults are fossorial and utilize mammal burrows and other subterranean refugia. Breeding occurs primarily in vernal pools and other seasonal water features.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented extant occurrence is four miles east of the Study Area (CDFW 2017)

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Blainville's (Coast) horned lizard <i>Phrynosoma blainvillii (coronatum)</i>	SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Prefers friable, rocky, or shallow sandy soils for burial; open areas for sunning; bushes for cover; and an abundant supply of ants and other insects.	Unlikely Potential. The Study Area is presumably former bayland/wetland and existing conditions are marginal with a low potential for colonization, as urban development impedes colonization from existing populations.
silvery legless lizard <i>Anniella pulchra pulchra</i>	SSC	Fossorial species, inhabiting sandy or loose loamy soils under relatively sparse vegetation. Suitable habitat includes dunes, stream terraces, and scrub and chaparral. Adequate soil moisture is essential.	Unlikely Potential. The Study Area is presumably former bayland/wetland and existing conditions are marginal with a low potential for colonization, as urban development impedes colonization from existing populations.
Pacific (western) pond turtle <i>Actinemys marmorata</i>	SSC	Thoroughly aquatic, inhabiting ponds, marshes, streams, and irrigation ditches with aquatic vegetation. Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks, and suitable upland habitat (sandy banks or grassy open fields) for egg-laying.	Moderate Potential. The Study Area contains aquatic features to support this species, with adjacent brackish tidal sloughs. The nearest documented occurrence is 0.5 miles west of the Study Area (CDFW 2017).
Fishes			
Pacific lamprey <i>Entosphenus (=Lampetra) tridentatus</i>	SSC	Spawns between March and July in gravel bottomed streams in riffle habitat. Larvae drift downstream to areas of low velocity and fine substrates and are relatively immobile in the stream substrates.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
river lamprey <i>Lampetra ayresi</i>	SSC	Lower Sacramento River, San Joaquin River and Russian River. May occur in coastal streams north of San Francisco Bay. Adults need clean, gravelly riffles, Ammocoetes need sandy backwaters or stream edges, good water quality and temps < 25 degrees C	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
green sturgeon <i>Acipenser medirostris</i>	FT, SSC	Anadromous. Spawns in the Sacramento and Klamath River systems. Lingering transients may be found throughout the San Francisco Bay Estuary, particularly juveniles.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
white sturgeon <i>Acipenser transmontanus</i>	SSC	Found in most estuaries along the Pacific coast. Adults in the San Francisco Bay Estuary system spawn in the Sacramento River and are not known to enter freshwater or non-tidal reaches of Estuary streams. Spawn May through June.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as rearing, and foraging habitat as well as providing a migratory corridor for this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon - Central Valley spring-run ESU <i>Oncorhynchus tshawytscha</i>	FT,ST, NMFS	Occurs in the Feather River and the Sacramento River and its tributaries, including Butte, Mill, Deer, Antelope and Beegum Creeks. Adults enter the Sacramento River from late March through September. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams from mid-August through early October. Juveniles migrate soon after emergence as young-of-the-year, or remain in freshwater and migrate as yearlings.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon – Sacramento winter-run ESU <i>Oncorhynchus tshawytscha</i>	FE, SE, NMFS	Occurs in the Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees C for spawning. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles typically migrate to the ocean soon after emergence from the	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Chinook salmon - central valley fall/late fall-run ESU <i>Oncorhynchus tshawytscha</i>	SSC, NMFS	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon - California coastal ESU <i>Oncorhynchus tshawytscha</i>	FT	California Coastal Chinook Salmon ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River (exclusive) to the Russian River (inclusive). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. Water temps >27 degrees C lethal to adults.	No Potential. The Study Area does not occur within this ESU's range.
Coho salmon - central CA coast ESU <i>Oncorhynchus kisutch</i>	FE, SE	Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen.	No Potential. This species is extirpated from San Francisco Bay and its tributaries (NMFS 2012).
steelhead - central valley DPS <i>Oncorhynchus mykiss irideus</i>	FT, NMFS	Includes all naturally spawned populations (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries, excluding San Francisco and San Pablo bays and their tributaries. Preferred spawning habitat is in cool to cold perennial streams with high dissolved oxygen levels and fast flowing water. Abundant riffle areas for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. Near the southern end of the Study Area, Pacheco Creek meets Walnut Creek, which currently supports a population of this species (Leidy et al 2005). Therefore, this species must migrate past the Study Area and may rear within tidally influenced portions of the Delta and creek before migrating to the open ocean. No suitable freshwater spawning habitat is present.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
steelhead - central CA coast DPS <i>Oncorhynchus mykiss irideus</i>	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area does not occur within this DPS's range.
steelhead - south/central CA coast DPS <i>Oncorhynchus mykiss irideus</i>	FT	Occurs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area does not occur within this DPS's range.
Delta smelt <i>Hypomesus transpacificus</i>	FT, SE	Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
longfin smelt <i>Spirinchus thaleichthys</i>	FC, ST, SSC	Euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species for migration as well as rearing and foraging. However, there is no suitable aquatic habitat in the Study Area.
Sacramento perch <i>Archoplites interruptus</i>	SSC	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley. Prefer warm water. Aquatic vegetation is essential for young. Tolerate wide range of physio-chemical water conditions.	No Potential. This species is considered extirpated throughout its native range and now only exists in isolated waterbodies (i.e. lakes or ponds) where it has been introduced (Crain and Moyle 2011).

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	SSC	Formerly endemic to the lakes and rivers of the Central Valley, but now confined to the Sacramento Delta, Suisun Bay and associated marshes. Occurs in slow-moving river sections and dead-end sloughs. Requires flooded vegetation for spawning and foraging for young. A freshwater species, but tolerant of moderate salinity (10-18 parts per thousand).	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
Invertebrates			
vernal pool andrenid bee <i>Andrena blennospermatis</i>	SSI	A solitary, ground-nesting bee found in upland areas near vernal pools. Its host plant is <i>Blennosperma</i> spp. and does not forage far from the host plant. Range is Contra Costa, El Dorado, Lake, Placer, Sacramento, San Joaquin, Solano, Sonoma, Tehama, and Yolo counties.	No Potential. The Study Area does not contain vernal pool habitat to support this species
Antioch andrenid bee <i>Perdita scitula antiochensis</i>	SSI	Occurs within the Antioch dunes. Visits flowers of <i>Eriogonum</i> spp., <i>Gutierrezia californica</i> , <i>Heterotheca grandiflora</i> , and <i>Lessingia glandulifera</i> .	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat or associated flowering plants.
Antioch Dunes halictid bee <i>Sphecodogastra antiochensis</i>	SSI	A rare, specialist foraging bee with a very restricted distribution—the Antioch Dunes of Contra Costa County, California.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
Antioch sphecid wasp <i>Philanthus nasalis</i>	SSI	Known only from the Antioch dunes of the Sacramento-San Joaquin Delta area, in the vicinity of Antioch, Contra Costa County. Also collected in Santa Cruz County.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
Antioch efferian robberfly <i>Efferia antiochi</i>	SSI	Known only from Antioch, Fresno, and Scout Island in the San Joaquin River.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
California linderiella <i>Linderiella occidentalis</i>	SSI	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity, and TDS.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is 0.6 mile west of the Study Area across Pacheco Creek (CDFW 2017).

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
conservancy fairy shrimp <i>Branchinecta conservatio</i>	FE, SSI	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	No Potential. The Study Area does not contain vernal pool habitat to support this species and is west of this species' known range. The nearest documented occurrence is over 10 miles northeast of the Study Area (CDFW 2017).
Longhorn fairy shrimp <i>Branchinecta longiantenna</i>	FE	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	No Potential. The Study Area does not contain vernal pool habitat to support this species.
vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FT, SSI	Endemic to the grasslands of the Central Valley, central coast mountains, and south coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is over 10 miles east of the Study Area (CDFW 2017).
vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE, SSI	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is over 15 miles northeast of the Study Area (CDFW 2017).
San Bruno elfin butterfly <i>Callophrys mossii bayensis</i>	FE, SSI	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, <i>Sedum spathulifolium</i> .	No Potential. The Study Area is outside this species' very limited extant range and does not contain rocky outcrops or coastal scrub to support the host plant.
monarch butterfly <i>Danaus plexippus</i>	Winter roost sites protected by CDFW	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, Monterey cypress), with nectar and water sources nearby.	Unlikely Potential. The Study Area does not contain groups of trees that would provide shelter from winds and extreme temperatures to support roosting. This species may forage within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	FE, SSI	Two populations in San Bruno mountain and the Cordelia Hills are recognized. Hostplant is <i>Viola pedunculata</i> , which is found on serpentine soils. Most adults found on east-facing slopes; males congregate on hilltops in search of females.	No Potential. The Study Area does not contain serpentine soils to support this species' host plant, <i>Viola pedunculata</i> .
Lange's metalmark butterfly <i>Apodemia mormo langei</i>	FE, SSI	Inhabits stabilized dunes along the San Joaquin River. Endemic to Antioch Dunes, Contra Costa County. Primary host plant is <i>Eriogonum nudum var. auriculatum</i> ; feeds on nectar of other wildflowers, as well as host plant.	No Potential. The Study Area does not contain this species' host plant, <i>Eriogonum nudum var. auriculatum</i> .
Antioch Dunes anthicid beetle <i>Anthicus antiochensis</i>	SSI	<i>Anthicus antiochensis</i> is apparently extirpated from the type locality at Antioch Dunes (CDFW 2015). Stabilization of the dunes in the 1950s may have eliminated suitable habitat. It is also known at several sites along the Sacramento River in Glenn, Tehama, Shasta, and Solano Counties, and from one site at Nicolas on the Feather River in Sutter County.	No Potential. The Study Area is outside this species' locally restricted range in the Antioch Dunes, where it is considered extirpated.
Delta green ground beetle <i>Elaphrus viridis</i>	FT, SSI	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis Air Force Base. Prefers the sandy mud substrate where it slopes gently into the water, with low-growing vegetation, 25 to 100% cover.	No Potential. The Study Area does not contain vernal pool habitat to support this species, and it is outside of this species' known range. The nearest documented occurrence is 17 miles northeast of the Study Area (CDFW 2017).
molestan blister beetle <i>Lytta molesta</i>	SSI	Inhabits the Central Valley of California, from Contra Costa to Kern and Tulare counties. <i>Lytta molesta</i> has been collected on <i>Lupinus</i> spp., <i>Trifolium wormskioldii</i> in dried vernal pools, and on <i>Eriodium</i> spp. Appears to be absent in nearby areas with non-vernal pool vegetation, but a lack of detailed collecting information makes it unclear whether the species is always or usually associated with dried vernal pools.	No Potential. The Study Area is outside the known range of this species and does not contain vernal pool habitat.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Joaquin dune beetle <i>Coelus gracilis</i>	SSI	Inhabits fossil dunes along the western edge of San Joaquin Valley; extirpated from Antioch Dunes (type locality). Inhabits sites containing sandy substrates.	Unlikely Potential. The Study Area is outside this species' range.
valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT, SSI	Occurs only in the central valley of California, in association with blue elderberry (<i>Sambucus</i> spp.). Prefers to lay eggs in elderberry 2 to 8 inches in diameter; some preference shown for "stressed" elderberry.	No Potential. The Study Area does not contain blue elderberry to support this species, and is outside of this species' known range. The nearest documented occurrence is over 10 miles north of the Study Area (CDFW 2017).
western bumble bee <i>Bombus occidentalis</i>	SCE, SSI	Formerly common throughout much of western North America; populations from southern British Columbia to central California have nearly disappeared (Xerces 2017). Occurs in a wide variety of habitat types. Nests are constructed annually in pre-existing cavities, usually on the ground (e.g. mammal burrows). Many plant species are visited and pollinated.	Unlikely Potential. This species is wide-ranging in California. The Study Area does not contain significant nectar sources and nesting substrates to support this species in any large concentration.

*** Key to status codes:**

BCC	U. S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern
CFP	CDFW Fully Protected Animal
FE	Federal Endangered
FT	Federal Threatened
SE	State Endangered
SCE	State Candidate Endangered
SSC	California Department of Fish and Wildlife (CDFW) Species of Conservation Concern
SSI	California Department of Fish and Wildlife (CDFW) Special Status Invertebrate
ST	State Threatened
SR	State Rare
Rank 1B	CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere
Rank 2B	CNPS Rank 2B: Plants rare, threatened, or endangered in California, but more common els
Rank 4	CNPS Rank 4: Plants of limited distribution (a watch list)

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-10/11/14)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
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WBWG		Western Bat Working Group Priority Species	
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****Potential to Occur:**

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Plants			
bent-flowered fiddleneck <i>Amsinckia lunaris</i>	Rank 1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. Elevation ranges from 10 to 1640 feet (3 to 500 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain coastal bluff scrub, cismontane woodland, and intact valley and foothill grassland. Likewise, this species is situated on rocky, colluvial or residual substrates, often derived from volcanic or ultramafic parent material; such substrates are absent from the Study Area, contemporarily and historically. Therefore, there is no potential for this species to occur within the Study Area.
California androsace <i>Androsace elongata ssp. acuta</i>	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, valley and foothill grassland. Elevation ranges from 490 to 3940 feet (150 to 1200 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain chaparral, coastal scrub, meadows and seeps, pinyon and juniper woodland, cismontane woodland, and intact, native valley and foothill grassland. Therefore, there is no potential for this species to occur within the Study Area.
slender silver moss <i>Anomobryum julaceum</i>	Rank 4.2	Broadleafed upland forest, lower montane coniferous forest, north coast coniferous forest/damp rock and soil on outcrops, usually on roadcuts. Elevation ranges from 330 to 3280 feet (100 to 1000 meters).	No Potential. The Study Area does not contain broadleafed upland forest, north coast coniferous forest/damp rock and soil on outcrops, roadcuts, and lower montane coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
coast rockcress <i>Arabis blepharophylla</i>	Rank 4.3	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub/rocky. Elevation ranges from 10 to 3610 feet (3 to 1100 meters). Blooms Feb-May.	No Potential. The Study Area does not contain broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub/rocky. This species occurs on bluff faces, rock crevices, and downhill talus of rock outcrops which are absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Mt. Diablo manzanita <i>Arctostaphylos auriculata</i>	Rank 1B.3	Chaparral (sandstone), cismontane woodland. Elevation ranges from 440 to 2130 feet (135 to 650 meters). Blooms Jan-Mar.	No Potential. The Study Area does not contain cismontane woodland or chaparral (sandstone). Therefore, there is no potential for this species to occur within the Study Area.
Contra Costa manzanita <i>Arctostaphylos manzanita ssp. laevigata</i>	Rank 1B.2	Chaparral (rocky). Elevation ranges from 1410 to 3610 feet (430 to 1100 meters). Blooms Jan-Mar (Apr).	No Potential. The Study Area does not contain chaparral (rocky). Therefore, there is no potential for this species to occur within the Study Area.
pallid manzanita <i>Arctostaphylos pallida</i>	FT, SE, Rank 1B.1	Broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub/siliceous shale, sandy or gravelly. Elevation ranges from 610 to 1530 feet (185 to 465 meters). Blooms Dec-Mar.	No Potential. The Study Area does not contain broadleaved upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub/siliceous shale, sandy or gravelly. Therefore, there is no potential for this species to occur within the Study Area.
alkali milk-vetch <i>Astragalus tener var. tener</i>	Rank 1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools/alkaline. Elevation ranges from 0 to 200 feet (1 to 60 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
heartscale <i>Atriplex cordulata var. cordulata</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy)/saline or alkaline. Elevation ranges from 0 to 1840 feet (0 to 560 meters). Blooms Apr-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area. Furthermore, highly localized seed sources for colonization of the site are lacking.
crownscale <i>Atriplex coronata var. coronata</i>	Rank 4.2	Chenopod scrub, valley and foothill grassland, vernal pools/alkaline, often clay. Elevation ranges from 0 to 1940 feet (1 to 590 meters). Blooms Mar-Oct.	Moderate Potential. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
brittlescale <i>Atriplex depressa</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools/alkaline, clay. Elevation ranges from 0 to 1050 feet (1 to 320 meters). Blooms Apr-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area. Furthermore, highly localized seed sources for colonization of the site are lacking.
vernal pool smallscale <i>Atriplex persistens</i>	Rank 1B.2	Vernal pools (alkaline). Elevation ranges from 30 to 380 feet (10 to 115 meters). Blooms Jun-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from intact, alkali vernal pool and playa complexes. Highly localized seed sources to colonize the Study Area are lacking.
big-scale balsamroot <i>Balsamorhiza macrolepis</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/sometimes serpentine. Elevation ranges from 300 to 5100 feet (90 to 1555 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain woodland, chaparral, or rocky, serpentine/volcanic grassland in a hilly setting necessary to support this species.
big tarplant <i>Blepharizonia plumosa</i>	Rank 1B.1	Valley and foothill grassland/usually clay.. Elevation ranges from 100 to 1660 feet (30 to 505 meters). Blooms Jul-Oct.	Unlikely. The Study Area does not contain intact naturally occurring grasslands underlain by clay substrates necessary to support this species.
Brewer's calandrinia <i>Calandrinia breweri</i>	Rank 4.2	Chaparral, coastal scrub/sandy or loamy, disturbed sites and burns. Elevation ranges from 30 to 4000 feet (10 to 1220 meters). Blooms (Jan), Mar-Jun.	No Potential. The Study Area does not contain scrub or chaparral habitat, nor does it contain recently burned areas.
round-leaved filaree <i>California macrophylla</i>	Rank 1B.2	Cismontane woodland, valley and foothill grassland/clay. Elevation ranges from 50 to 3940 feet (15 to 1200 meters). Blooms Mar-May.	No Potential. The Study Area does not contain cismontane woodland, valley and foothill grassland/clay. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo fairy-lantern <i>Calochortus pulchellus</i>	Rank 1B.2	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. Elevation ranges from 100 to 2760 feet (30 to 840 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral, riparian woodland, cismontane woodland, valley and foothill grassland. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Tiburon mariposa-lily <i>Calochortus tiburonensis</i>	FT, ST, Rank 1B.1	Valley and foothill grassland. On open, rocky, slopes in serpentine grassland. 50-150 m.	No potential. The Study Area does not contain valley and foothill grassland (Serpentine). Therefore, there is no potential for this species to occur within the Study Area.
Oakland star-tulip <i>Calochortus umbellatus</i>	Rank 4.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/often serpentine. Elevation ranges from 330 to 2300 feet (100 to 700 meters). Blooms Mar-May.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/ often serpentine. Therefore, there is no potential for this species to occur within the Study Area.
chaparral harebell <i>Campanula exigua</i>	Rank 1B.2	Chaparral (rocky, usually serpentine). Elevation ranges from 900 to 4100 feet (275 to 1250 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral (rocky, usually serpentine). Therefore, there is no potential for this species to occur within the Study Area.
Lynngbye's sedge <i>Carex lynngbye</i>	Rank 2B.2	Marshes and swamps (brackish or freshwater). 0-200 m.	Unlikely. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass), it is not connected to open tidal or muted tidal activity (i.e., marsh plain). Nearest occurrence is 15 miles distant in Solano County on Rush Ranch so seed sources are limited from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Tiburon paintbrush <i>Castilleja affinis var. neglecta</i>	FE, ST, Rank 1B.2	Valley and foothill grassland (serpentine). Elevation ranges from 200 to 1310 feet (60 to 400 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain valley and foothill grassland (serpentine). Therefore, there is no potential for this species to occur within the Study Area.
johnny-nip <i>Castilleja ambigua var. ambigua</i>	Rank 4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal poolsmargins. Elevation ranges from 0 to 1430 feet (0 to 435 meters). Blooms Mar-Aug.	No Potential. The Study Area does not contain scrub, prairie, freshwater seasonal marsh, intact vernal pool complex, or naturally occurring grassland habitats necessary to support this species.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
holly-leaved ceanothus <i>Ceanothus purpureus</i>	Rank 1B.2	Chaparral, cismontane woodland/volcanic, rocky. Elevation ranges from 390 to 2100 feet (120 to 640 meters). Blooms Feb-Jun.	No Potential. The Study Area does not contain chaparral and cismontane woodland/volcanic (rocky). Therefore, there is no potential for this species to occur
Congdon's tarplant <i>Centromadia parryi ssp. congdonii</i>	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 750 feet (0 to 230 meters). Blooms May-Oct (Nov).	High. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area. Additionally, there are documented occurrences approximately one mile distant from the Study Area that could provide a viable seed source.
pappose tarplant <i>Centromadia parryi ssp. parryi</i>	Rank 1B.2	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic)/often alkaline. Elevation ranges from 0 to 1380 feet (0 to 420 meters). Blooms May-Nov.	Moderate. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area.
Parry's rough tarplant <i>Centromadia parryi ssp. rudis</i>	Rank 4.2	Valley and foothill grassland, vernal pools/alkaline, vernal mesic, seeps, sometimes roadsides. Elevation ranges from 0 to 330 feet (0 to 100 meters). Blooms May-Oct.	Moderate. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area.
hispid bird's-beak <i>Chloropyron molle ssp. hispidum</i>	Rank 1B.1	Meadows and seeps, playas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 510 feet (1 to 155 meters). Blooms Jun-Sep.	Unlikely. Although the Study Area contains seasonal wetlands, this species is closely associated with intact alkali vernal pool-grassland complexes which are absent from the Study Area. Likewise, there is no localized seed sources for colonization of the site.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
soft bird's-beak <i>Chloropyron molle ssp. molle</i>	FE, SR, Rank 1B.2	Marshes and swamps (coastal salt). Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms Jul-Nov.	Unlikely. Although the Study Area contains elements of brackish marsh vegetation (e.g., salt grass, pickleweed); however, these areas do not contain tidal hydrology necessary to support this species.
Bolander's water-hemlock <i>Cicuta maculata var. bolanderi</i>	Rank 2B.1	Marshes and swampscoastal, fresh or brackish water. Elevation ranges from 0 to 660 feet (0 to 200 meters). Blooms Jul-Sep.	High Potential. The Study Area contains wetland features with perennial hydrology or seasonally saturated emergent vegetation, specifically along the Clean Water Canal. However, these areas are extremely limited within the unit. Bolander's hemlock was not observed during rare plant surveys conducted in the WMUs.
Franciscan thistle <i>Cirsium andrewsii</i>	Rank 1B.2	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub/mesic, sometimes serpentine. Elevation ranges from 0 to 490 feet (0 to 150 meters). Blooms Mar-Jul.	No Potential. The Study Area does not contain broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub/mesic sometimes serpentine. Therefore, there is no potential for this species to occur within the Study Area.
Suisun thistle <i>Cirsium hydrophilum var. hydrophilum</i>	FE, Rank 1B.1	Marshes and swamps (salt). Elevation ranges from 0 to 0 feet (0 to 1 meters). Blooms Jun-Sep.	Unlikely. Although the Study Area does contain elements of salt marsh vegetation, this species typically occurs within tidal influenced salt marsh habitat. Given the site is disconnected from active tidal influence. The Study Area is unlikely to support this species.
serpentine collomia <i>Collomia diversifolia</i>	Rank 4.3	Chaparral, cismontane woodland/serpentine, rocky or gravelly. Elevation ranges from 980 to 1970 feet (300 to 600 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Likewise, this species occurs on rocky, gravelly serpentine substrate that is absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Mt. Diablo bird's-beak <i>Cordylanthus nidularius</i>	SR, Rank 1B.1	Chaparral (serpentine). Elevation ranges from 1970 to 2620 feet (600 to 800 meters). Blooms Jun-Aug.	No Potential. The Study Area does not contain chaparral. Likewise, this species is a serpentine endemic; serpentine substrate is absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.
Hospital Canyon larkspur <i>Delphinium californicum ssp. interius</i>	Rank 1B.2	Chaparral (openings), cismontane woodland (mesic), coastal scrub. Elevation ranges from 640 to 3590 feet (195 to 1095 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
western leatherwood <i>Dirca occidentalis</i>	Rank 1B.2	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland/mesic. Elevation ranges from 80 to 1390 feet (25 to 425 meters). Blooms Jan-Mar (Apr).	No Potential. The Study Area does not contain broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, or riparian woodland. Therefore, there is no potential for this species to occur within the Study Area.
dwarf downingia <i>Downingia pusilla</i>	Rank 2B.2	Valley and foothill grassland (mesic), vernal pools. Elevation ranges from 0 to 1460 feet (1 to 445 meters). Blooms Mar-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
small spikerush <i>Eleocharis parvula</i>	Rank 4.3	Marshes and swamps. Elevation ranges from 0 to 9910 feet (1 to 3020 meters). Blooms (Apr), Jun-Aug (Sep).	Unlikely. Although the Study Area does contain elements of marsh vegetation, it occurs along steep man-made channels and is disconnected from tidal influence. This species grows in undisturbed tidal habitat and the Study Area is entirely disturbed. Therefore, the Study Area is unlikely to support this species.
Lime Ridge eriastrum <i>Eriastrum erterae</i>	Rank 1B.1	Chaparral (openings or edges)/alkaline or semi-alkaline, sandy.. Elevation ranges from 660 to 950 feet (200 to 290 meters). Blooms Jun-Jul.	No Potential. The Study Area does not contain chaparral. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
streamside daisy <i>Erigeron biolettii</i>	Rank 3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest/rocky, mesic. Elevation ranges from 100 to 3610 feet (30 to 1100 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain broadleafed upland forest, cismontane woodland, or north coast coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
Tiburon buckwheat <i>Eriogonum luteolum var. caninum</i>	Rank 1B.2	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland/serpentine, sandy to gravelly. Elevation ranges from 0 to 2300 feet (0 to 700 meters). Blooms May-Sep.	No Potential. The Study Area does not contain coastal prairie, valley and foothill grassland/serpentine, chaparral, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo buckwheat <i>Eriogonum truncatum</i>	Rank 1B.1	Chaparral, coastal scrub, valley and foothill grassland/sandy. Elevation ranges from 10 to 1150 feet (3 to 350 meters). Blooms Apr-Sep (Nov), (Dec).	No Potential. The Study Area does not contain coastal scrub or chaparral, and the herbaceous communities are not intact native grassland. Furthermore, the Study Area substrate is not sandy.
Jepson's woolly sunflower <i>Eriophyllum jepsonii</i>	Rank 4.3	Chaparral, cismontane woodland, coastal scrub/sometimes serpentine. Elevation ranges from 660 to 3360 feet (200 to 1025 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral, cismontane woodland, or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Jepson's coyote thistle <i>Eryngium jepsonii</i>	Rank 1B.2	Vernal pools, valley and foothill grassland. Elevation range from 10 to 975 feet (3 to 300 meters). Blooms Apr-Aug.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Contra Costa wallflower <i>Erysimum capitatum var. angustatum</i>	FE, SE, Rank 1B.1	Inland dunes. Elevation ranges from 10 to 70 feet (3 to 20 meters). Blooms Mar-Jul.	No Potential. The Study Area does not contain aeolian or inland dune habitat necessary to support this species. This species is highly restricted to the Antioch Dunes.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Joaquin spearscale <i>Extriplex joaquinana</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 2740 feet (1 to 835 meters). Blooms Apr-Oct.	Moderate. Although the Study Area does not contain intact playa or alkali grassland, this species is somewhat tolerant of disturbance and there is a seed source approximately one mile distant.
minute pocket moss <i>Fissidens pauperculus</i>	Rank 1B.2	North coast coniferous forest (damp coastal soil). Elevation ranges from 30 to 3360 feet (10 to 1024 meters).	No Potential. The Study Area does not contain north coast coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
fragrant fritillary <i>Fritillaria liliacea</i>	Rank 1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland/often serpentine. Elevation ranges from 10 to 1350 feet (3 to 410 meters). Blooms Feb-Apr.	No Potential. The Study Area does not contain woodland, prairie, scrub, or intact, native grassland habitat. Furthermore, this species is known from undisturbed rocky, clay substrates derived from volcanics or serpentine.
Toren's grimmia <i>Grimmia torenii</i>	Rank 1B.3	Chaparral, cismontane woodland, lower montane coniferous forest/openings, rocky, boulder and rock walls, carbonate, volcanic. Elevation ranges from 1070 to 3810 feet (325 to 1160 meters).	No Potential. The Study Area does not contain chaparral lower montane coniferous forest, rocky, boulders, rock walls, carbonate, or volcanic rock. Therefore, there is no potential for this species to occur within the Study Area.
Diablo helianthella <i>Helianthella castanea</i>	Rank 1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland/usually rocky, axonal soils. often in partial shade. Elevation ranges from 200 to 4270 feet (60 to 1300 meters). Blooms Mar-Jun	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, coastal scrub, valley and foothill grassland/rocky, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Brewer's western flax <i>Hesperolinon breweri</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/usually serpentine. Elevation ranges from 100 to 3100 feet (30 to 945 meters). Blooms May-Jul.	No Potential. The Study Area does not contain chaparral, valley and foothill grassland/ usually serpentine, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Santa Cruz tarplant <i>Holocarpha macradenia</i>	FT, SE, Rank 1B.1	Coastal prairie, coastal scrub, valley and foothill grassland/often clay, sandy. Elevation ranges from 30 to 720 feet (10 to 220 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain coastal prairie, coastal scrub, valley and foothill grassland/often clay, or sandy. Therefore, there is no potential for this species to occur within the Study Area.
coast iris <i>Iris longipetala</i>	Rank 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps/mesic. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms Mar-May.	No Potential. The Study Area does not contain coastal prairie, lower montane coniferous forest, meadows, and seeps. Therefore, there is no potential for this species to occur within the Study Area.
Carquinez goldenbush <i>Isocoma arguta</i>	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 70 feet (1 to 20 meters). Blooms Aug-Dec.	No Potential. The Study Area does not contain undisturbed, intact, native alkali grasslands necessary to support this species.
Southern California black walnut <i>Juglans californica</i>	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland/alluvial. Elevation ranges from 160 to 2950 feet (50 to 900 meters). Blooms Mar-Aug.	No Potential. The Study Area does not contain chaparral, cismontane woodland, coastal scrub, or riparian woodland/alluvial. Therefore, there is no potential for this species to occur within the Study Area.
Contra Costa goldfields <i>Lasthenia conjugens</i>	FE, Rank 1B.1	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools/mesic. Elevation ranges from 0 to 1540 feet (0 to 470 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Ferris' goldfields <i>Lasthenia ferrisiae</i>	Rank 4.2	Vernal pools (alkaline, clay). Elevation ranges from 70 to 2300 feet (20 to 700 meters). Blooms Feb-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Coulter goldfields <i>Lasthenia glabrata ssp. coulteri</i>	Rank 1B.1	alkaline soils in playas, sinks, grasslands, marshes, swamps, and vernal pools at elevations ranging from 0 to 4000 feet. Blooms Feb-June	Unlikely Potential. Soils, seasonal wetlands and grasslands in Study Area are disturbed. Assesed due to an unconfirmed occurrence of this species was documented by Z. Akulova near Walnut Creek, east of Martinez in 2009.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	Rank 1B.2	Marshes and swamps (freshwater and brackish). Elevation ranges from 0 to 20 feet (0 to 5 meters). Blooms May-Jul (Aug), (Sep).	High potential. The Study Area is in proximity to coastal brackish marsh with associated species in high densities and adjacent the Clean Water Canal and the relative location of the nearest documented Occurrence.
legenere <i>Legenere limosa</i>	Rank 1B.1	Vernal pools. Elevation ranges from 0 to 2890 feet (1 to 880 meters). Blooms Apr-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Jepson's leptosiphon <i>Leptosiphon jepsonii</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland. Open to partially shaded grassy slopes. On volcanics or the periphery of serpentine substrates. 55-855 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
woolly-headed lessingia <i>Lessingia hololeuca</i>	Rank 3	Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland/clay, serpentine. Elevation ranges from 50 to 1000 feet (15 to 305 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain scrub, forest, or intact, undisturbed grassland necessary to support this species. Furthermore, the Study Area does not contain serpentine clay substrate.
Mason's lilaepsis <i>Lilaepsis masonii</i>	SR, Rank 1B.1	Marshes and swamps (brackish or freshwater), riparian scrub. Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms Apr-Nov.	Unlikely. Although the Study Area contains elements of marsh habitat, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs with direct tidal action. Therefore, it is unlikely for this species to occur within the Study Area.
Delta mudwort <i>Limosella australis</i>	Rank 2B.1	Marshes and swamps (freshwater or brackish), riparian scrub/usually mud banks. Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms May-Aug.	Unlikely. Although the Study Area contains elements of marsh habitat, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs and mud flats with direct tidal action.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Showy golden madia <i>Madia radiata</i>	Rank 1B.1	Valley and foothill grassland, cismontane woodland. Mostly on adobe clay in grassland or among shrubs. 75-1220 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
Hall's bush-mallow <i>Malacothamnus hallii</i>	Rank 1B.2	Chaparral, coastal scrub. Elevation ranges from 30 to 2490 feet (10 to 760 meters). Blooms May-Sep (Oct).	No Potential. The Study Area does not contain chaparral or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Oregon meconella <i>Meconella oregana</i>	Rank 1B.1	Coastal prairie, coastal scrub. Elevation ranges from 820 to 2030 feet (250 to 620 meters). Blooms Mar-Apr.	No Potential. The Study Area does not contain chaparral or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo cottonweed <i>Micropus amphibolus</i>	Rank 3.2	Broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland/rocky. Elevation ranges from 150 to 2710 feet (45 to 825 meters). Blooms Mar-May.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, valley and foothill grassland/rocky, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
marsh microseris <i>Microseris paludosa</i>	Rank 1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. Elevation ranges from 20 to 1160 feet (5 to 355 meters). Blooms Apr-Jun (Jul).	No Potential. The Study Area does not contain closed-cone coniferous forest, undisturbed valley and foothill grassland, coastal scrub, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
San Antonio Hills monardella <i>Monardella antonina ssp. antonina</i>	Rank 3	Chaparral, cismontane woodland. Elevation ranges from 1050 to 3280 feet (320 to 1000 meters). Blooms Jun-Aug.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
woodland woollythreads <i>Monolopia gracilens</i>	Rank 1B.2	Broadleafed upland forest (openings), chaparral (openings), cismontane woodland, north coast coniferous forest (openings), valley and foothill grassland/serpentine. Elevation ranges from 330 to 3940 feet (100 to 1200 meters). Blooms (Feb), Mar-Jul.	No Potential. The Study Area does not contain north coast coniferous forest, broadleafed upland forest, chaparral, undisturbed valley and foothill grassland, or cismontane woodland. Furthermore, the Study Area lacks serpentine substrate.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
little mouseltail <i>Myosurus minimus ssp. apus</i>	Rank 3.1	Valley and foothill grassland, vernal pools (alkaline). Elevation ranges from 70 to 2100 feet (20 to 640 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Lime Ridge navarretia <i>Navarretia gowenii</i>	Rank 1B.1	Chaparral. Elevation ranges from 590 to 1000 feet (180 to 305 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral. Therefore, there is no potential for this species to occur within the Study Area.
Baker's navarretia <i>Navarretia leucocephala ssp. bakeri</i>	Rank 1B.1	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 20 to 5710 feet (5 to 1740 meters). Blooms Apr-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Colusa grass <i>Neostapfia colusana</i>	FT, SE, Rank 1B.1	Vernal pools. Usually in the bottoms of large or deep vernal pools; adobe soils. 5-125 m.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur
Antioch Dunes evening-primrose <i>Oenothera deltooides ssp. howellii</i>	FE, SE, Rank 1B.1	Inland dunes. Elevation ranges from 0 to 100 feet (0 to 30 meters). Blooms Mar-Sep.	No Potential. The Study Area does not contain aeolian or inland dune habitat necessary to support this species. This species is highly restricted to the Antioch Dunes.
White-rayed pentachaeta <i>Pentachaeta bellidiflora</i>	FE, SE, Rank 1B.1	Valley and foothill grassland, cismontane woodland. Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 35-610 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo phacelia <i>Phacelia phacelioides</i>	Rank 1B.2	Chaparral, cismontane woodland/rocky. Elevation ranges from 1640 to 4490 feet (500 to 1370 meters). Blooms Apr-May.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
bearded popcornflower <i>Plagiobothrys hystriculus</i>	Rank 1B.1	Valley and foothill grassland (mesic), vernal pool/margins/often vernal swales. Elevation ranges from 0 to 900 feet (0 to 274 meters). Blooms Apr-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Marin knotweed <i>Polygonum marinense</i>	Rank 3.1	Marshes and swamps (coastal salt or brackish). Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms (Apr), May-Aug (Oct).	Unlikely. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass), it is not connected to open tidal or muted tidal activity (i.e., marsh plain). The muted tidal areas are restricted to steep sloped channels which are unlikely to support this species.
California alkali grass <i>Puccinellia simplex</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools/alkaline, vernal mesic; sinks, flats, and lake margins. Elevation ranges from 10 to 3050 feet (2 to 930 meters). Blooms Mar-May.	Unlikely. Although the Study Area contains seasonal wetlands which have a hydroperiod similar to vernal pools, this species is restricted to intact, interior alkali vernal pool complexes which are absent from the Study Area.
Lobb's aquatic buttercup <i>Ranunculus lobbii</i>	Rank 4.2	Cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms Feb-May.	No Potential. The Study Area does not contain north coast coniferous forest, valley and foothill grassland, vernal pools, or cismontane woodland. Restricted to freshwater pools of approximately six inches or greater in depth. Therefore, there is no potential for this species to occur within the Study Area.
rock sanicle <i>Sanicula saxatilis</i>	SR, Rank 1B.2	Broadleafed upland forest, chaparral, valley and foothill grassland/rocky. Elevation ranges from 2030 to 3850 feet (620 to 1175 meters). Blooms Apr-May.	No Potential. The Study Area does not contain broadleafed upland forest, undisturbed grassland, or chaparral. Furthermore, the Study Area does not contain rocky substrates necessary to support this species. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
chaparral ragwort <i>Senecio aphanactis</i>	Rank 2B.2	Chaparral, cismontane woodland, coastal scrub/sometimes alkaline. Elevation ranges from 50 to 2620 feet (15 to 800 meters). Blooms Jan-Apr.	No Potential. The Study Area does not contain north coast coniferous forest, undisturbed valley and foothill grassland, vernal pools, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
long-styled sand-spurrey <i>Spergularia macrotheca var. longistyla</i>	Rank 1B.2	Alkali seasonal marshes, mud flats, alkali meadows, and alkali hot springs. Elevation ranges from 0 to 830 feet (0 to 255 meters). Blooms Feb-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is closely associated with intact, highly alkali habitats absent from the Study Area.
most beautiful jewelflower <i>Streptanthus albidus ssp. peramoenus</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/serpentine. Elevation ranges from 310 to 3280 feet (95 to 1000 meters). Blooms (Mar), Apr-Sep (Oct).	No Potential. The Study Area does not contain chaparral, valley and foothill grassland, or cismontane woodland. The Study Area does not contain serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo jewelflower <i>Streptanthus hispidus</i>	Rank 1B.3	Chaparral, valley and foothill grassland/rocky. Elevation ranges from 1200 to 3940 feet (365 to 1200 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain chaparral, valley and foothill grassland, or cismontane woodland. The Study Area does not contain serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
slender-leaved pondweed <i>Stuckenia filiformis ssp. alpina</i>	Rank 2B.2	Marshes and swamps (assorted shallow freshwater). Elevation ranges from 980 to 7050 feet (300 to 2150 meters). Blooms May-Jul.	Unlikely. Although the Study Area contains brackish wetlands, the brackish water likely precludes the presence of this submerged, freshwater species.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California seablite <i>Suaeda californica</i>	FE, Rank 1B.1	Marshes and swamps. Margins of coastal salt marshes. 0-5 m.	Unlikely. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass), it is not connected to open tidal or muted tidal activity (i.e., marsh plain). Closest documented occurrence is 18 miles away near the City of Richmond, last seen in 1912 and presumed extirpated (CDFW 2021). Extant occurrences 25 miles distant (CDFW 2021) so seed sources are absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Suisun Marsh aster <i>Symphotrichum lentum</i>	Rank 1B.2	Marshes and swamps (brackish and freshwater). Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms (Apr), May-Nov.	High Potential. The Study Area is adjacent to freshwater marsh habitat that may support this species. Additionally, this species is relatively tolerant of disturbance. however, these are extremely limited within the Study Area. Likewise, there are documented extant occurrences less than 0.5 mile distant from the Study Area.
saline clover <i>Trifolium hydrophilum</i>	Rank 1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Elevation ranges from 0 to 980 feet (0 to 300 meters). Blooms Apr-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
coastal triquetrella <i>Triquetrella californica</i>	Rank 1B.2	Coastal bluff scrub, coastal scrub/soil. Elevation ranges from 30 to 330 feet (10 to 100 meters).	No Potential. The Study Area does not contain coastal bluff scrub and coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
caper-fruited tropidocarpum <i>Tropidocarpum capparideum</i>	Rank 1B.1	Valley and foothill grassland (alkaline hills). Elevation ranges from 0 to 1490 feet (1 to 455 meters). Blooms Mar-Apr.	No Potential. The Study Area does not contain alkali hilly grasslands necessary to support this species. Therefore, there is no potential for this species to occur within the Study Area.

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(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
oval-leaved viburnum <i>Viburnum ellipticum</i>	Rank 2B.3	Chaparral, cismontane woodland, lower montane coniferous forest. Elevation ranges from 710 to 4590 feet (215 to 1400 meters). Blooms May-Jun.	No Potential. The Study Area does not contain lower montane coniferous forest, chaparral, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Mammals			
pallid bat <i>Antrozous pallidus</i>	SSC, WBWG	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, forages along river channels. Roost sites include crevices in rocky outcrops and cliffs, caves, mines, trees and various human structures such as bridges, barns, and buildings (including occupied buildings). Roosts must protect bats from high temperatures. Very sensitive to disturbance.	Unlikely. The Study Area does not contain any large trees with cavities or undisturbed buildings with suitable habitat to support roosting. This species may be observed foraging within the Study Area, but it is unlikely to roost there. The nearest documented occurrence is four miles from the Study Area (CDFW 2017).
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	SSC, WBWG	This species is associated with a wide variety of habitats from deserts to mid-elevation mixed coniferous-deciduous forest. Females form maternity colonies in buildings, caves and mines and males roost singly or in small groups. Foraging occurs in open forest habitats where they glean moths from vegetation.	Unlikely. This species is sensitive to disturbance and no caves, mines, or other undisturbed, suitable roost habitat is present in the Study Area or vicinity. The Study Area does not contain the forested communities this species prefers. The nearest documented occurrence is 6.5 miles from the Study Area (CDFW 2017).
western red bat <i>Lasiurus blossevillii</i>	SSC, WBWG	This species is typically solitary, roosting primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact	Unlikely. The Study Area does not contain riparian habitat with large trees to support roosting for this species. This species may be observed foraging within the Study Area, but it is unlikely to roost there.
hoary bat <i>Lasiurus cinereus</i>	WBWG	Prefers open forested habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large	Unlikely. The Study Area does not contain riparian habitat with large trees to support roosting for this species. This species may be observed foraging within the Study Area,

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
big free-tailed bat <i>Nyctinomops macrotis</i>	SSC, WBWG	Occurs rarely in low-lying arid areas. Requires high cliffs or rocky outcrops for roosting sites.	Unlikely. No cliffs or other suitable roost habitat are present within the Study Area or vicinity. The Study Area is outside this species known range, and although there is a documented occurrence within 3.8 miles of the Study Area, this occurrence is considered vagrant.
American badger <i>Taxidea taxus</i>	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Requires friable soils and open, uncultivated ground. Preys on burrowing rodents.	Unlikely. The Study Area is an industrial work area with frequent disturbance and no connectivity to known occupied or suitable open grassland habitats. The nearest documented occurrence is 12 miles southwest of the Study Area (CDFW 2017)
ringtail <i>Bassariscus astutus</i>	CFP	Widely distributed throughout most of California, absent from some portions of the Central Valley and northeastern California. Found in a variety of habitats including	No Potential. The Study Area does not contain suitable woodland or chaparral habitat adjacent to freshwaters to support foraging or denning for this species.
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	SSC	Forest habitats of moderate canopy and moderate to dense understory. Also in chaparral habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	No Potential. The Study Area does not contain riparian or chaparral habitat to provide cover or material for nesting. The nearest documented occurrence is over seven miles south of the Study Area (CDFW 2017).
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	FE, ST	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	No Potential. The Study Area is east of the species' known range and does not contain connectivity to suitable open grassland habitat. The nearest documented occurrence is over 10 miles southeast of the Study Area (CDFW 2017).

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	FE, SE, CFP	Endemic to emergent salt and brackish wetlands of the San Francisco Bay Estuary. Pickleweed marshes are primary habitat; also occurs in various other wetland communities with dense vegetation. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	Moderate Potential. The Study Area contains wetland communities suitable for this species. Additionally, upland communities adjacent to marshes present within the Study Area may be used opportunistically for foraging by this species. The nearest documented occurrences are in Point Edith Wildlife Area and across Pacheco Creek west of the Study Area (CDFW 2017).
Suisun shrew <i>Sorex ornatus sinuosus</i>	SSC	Tidal marshes of the northern shores of San Pablo and Suisun Bays. Require dense low-lying cover and drift weed and other litter above the mean high tide line for nesting and foraging.	Unlikely. Although the Study Area is immediately adjacent to Suisun Bay, it is located along the southern shores and therefore within the range of and does not provide habitat connectivity to support this subspecies. The nearest documented occurrence is over five miles north of Study Area, across Suisun Bay (CDFW 2017).
Birds			
golden eagle <i>Aquila chrysaetos</i>	CFP, BCC, EPA	Occurs year-round in rolling foothills, mountain areas, sage-juniper flats, and deserts. Cliff-walled canyons provide nesting habitat in most parts of range; also nests in large trees, usually within otherwise open areas.	Unlikely. The Study Area does not contain canyons of cliffs or large trees to support nesting of this species. The nearest documented nesting occurrence is six miles north of the Study Area (CDFW 2017). This species may occasionally forage within the Study Area.
bald eagle <i>Haliaeetus leucocephalus</i>	FD, SE, CFP, BCC, EPA	Occurs year-round in California, but primarily a winter visitor. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	Unlikely. The Study Area does not contain large trees to support nesting of this species. The nearest documented nesting occurrence is over 11 miles west of the Study Area (CDFW 2017). This species may occasionally forage within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
northern harrier <i>Circus cyaneus</i>	SSC	Year-round resident and winter visitor. Found in open habitats including grasslands, prairies, marshes and agricultural areas. Nests on the ground in dense vegetation, typically near water or otherwise moist areas. Preys on small vertebrates.	Present. The Study Area provides some open foraging habitat for this species, and low wetland vegetation suitable for nesting.
white-tailed kite <i>Elanus leucurus</i>	CFP	Year-round resident in coastal and valley lowlands with scattered trees and large shrubs, including grasslands, marshes and agricultural areas. Nests in trees, of which the type and setting are highly variable. Preys on small mammals and other vertebrates.	Moderate Potential. The Study Area contains open grassland habitat to provide foraging, and there are suitably large trees and shrubs to support nesting in and around the Study Area.
American peregrine falcon <i>Falco peregrinus anatum</i>	FD, SD, CFP, BCC	Year-round resident and winter visitor. Occurs in a wide variety of habitats, though often associated with coasts, bays, marshes and other bodies of water. Nests on protected cliffs and also on man-made structures including buildings and bridges. Preys on birds, especially water birds. Forages widely.	Unlikely. The Study Area does not contain suitable elevated nesting structures such as cliffs or tall buildings. This species may occasionally pass through the Study Area but it is unlikely to nest there.
prairie falcon <i>Falco mexicanus</i>	BCC	Year-round resident and winter visitor. Inhabits dry, open terrains, including foothills and valleys. Breeding sites located on steep cliffs. Forages widely.	Unlikely. The Study Area does not contain steep cliffs or open valleys to support breeding by this species.
ferruginous hawk <i>Buteo regalis</i>	BCC	Winter visitor to open habitats, including grasslands, sagebrush flats, scrub, and low foothills surrounding valleys. Preys on mammals. Does not breed in California.	Unlikely. The species does not breed in the region, but may be observed foraging within the Study Area during the non-breeding season.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Swainson's hawk <i>Buteo swainsoni</i>	ST, BCC	Summer resident in California's Central Valley and limited portions of the southern California interior. Nests in tree groves and isolated trees in riparian and agricultural areas, including near buildings. Forages in grasslands and scrub habitats as well as agricultural fields, especially alfalfa. Preys on arthropods year-round as well as smaller vertebrates during the breeding season.	Unlikely. Although the Study Area contains open grasslands typical to support foraging, the Study Area does not contain large trees suitable for nesting. The nearest documented occurrence is over 10 miles east of the Study Area (CDFW 2017).
burrowing owl <i>Athene cunicularia</i>	SSC, BCC	Year-round resident and winter visitor. Occurs in open, dry grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, most commonly those of ground squirrels.	Moderate Potential. Much of the Study Area contains bare ground or short vegetation, and there are some burrows in these areas suitable for occupation by this species. The nearest documented occurrence is 1.2 miles south of the Study Area (CDFW 2017).
short-eared owl <i>Asio flammeus</i>	SSC	Occurs year-round, but primarily as a winter visitor; breeding very restricted in most of California. Found in open, treeless areas (e.g., marshes, grasslands) with elevated sites for foraging perches and dense herbaceous vegetation for roosting and nesting. Preys mostly on small mammals, particularly voles.	Unlikely. This species is a rare nester in the region, and disturbance regimens within the Study Area reduce the potential for nesting by this species. The nearest documented nesting occurrence is 10 miles east of the Study Area (CDFW 2017).
long-eared owl <i>Asio otus</i>	SSC	Occurs year-round in California. Nests in trees in a variety of woodland habitats, including oak and riparian, as well as tree groves. Requires adjacent open land with rodents for foraging, and the presence of old nests of larger birds (hawks, crows, magpies) for breeding.	Unlikely. This species is rare in the region, and has not been documented in the vicinity (Glover 2009, CDFW 2017). In addition, the Study Area does not contain riparian or woodland communities to support nesting.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Northern spotted owl <i>Strix occidentalis caurina</i>	FT, ST	Year-round resident in dense, structurally complex coniferous and mixed (coniferous-hardwood) forests, usually those with old-growth conifers. Nests on platform-like substrates in the forest canopy, including in tree cavities. Preys on mammals.	No Potential. The Study Area does not contain suitable coniferous or mixed forest habitat that this species requires.
black oystercatcher <i>Haematopus bachmani</i>	BCC	Year-round resident of rocky coast habitats along the Pacific coast. Also occurs on coastal and lower estuarine mud-flats. Forages primarily on intertidal invertebrates.	No Potential. The Study Area does not contain mud-flats or coastal habitat. Suitable foraging habitat may be present along the shores of the Suisun Bay, 300 feet north of the Study Area.
California black rail <i>Laterallus jamaicensis coturniculus</i>	ST, CFP	Year-round resident in marshes (saline to freshwater) with dense vegetation within four inches of the ground. Prefers larger, undisturbed marshes that have an extensive upper zone and are close to a major water source. Extremely secretive and cryptic.	Unlikely. The Study Area lacks direct tidal influence and provides only highly marginal habitat. However, tidal/brackish wetlands containing dense pickleweed vegetation are present west across the Clean Water Canal in Point Edith Wildlife Area, where this species has been observed (CDFW 2017) and detected during Study Area surveys. Pickleweed is present within the Study Area, but not large expanses suitable to support black rail or foraging habitat (tidal sloughs or other areas with dense veg). In addition, WRA has surveyed the Study Area for multiple years and has not detected black rails nesting within the Study Area.

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(WMU-31)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California Ridgway's (clapper) rail <i>Rallus obsoletus obsoletus</i>	FE, SE, CFP	Year-round resident in tidal marshes of the San Francisco Bay estuary. Requires tidal sloughs and intertidal mud flats for foraging, and dense marsh vegetation for nesting and cover. Typical habitat features abundant growth of cordgrass and pickleweed. Feeds primarily on mollusks and crustaceans.	Unlikely. The Study Area lacks tidal influence and provides no suitable habitat. Tidal/brackish wetlands are present adjacent to the Study Area in Point Edith Wildlife Area, where this species has a documented occurrence (CDFW 2017). During a single Study Area survey, one individual was observed in 2009 moving through Point Edith Wildlife Area. WRA has surveyed the Study Area for multiple years and has not detected Ridgway's rails nesting within the Study Area or the adjacent Point Edith Wildlife Area.
California least tern <i>Sternula antillarum browni</i>	FE, SE, CFP	Summer resident along the coast from San Francisco Bay south to northern Baja California; inland breeding also very rarely occurs. Nests colonially on barren or sparsely vegetated areas with sandy or gravelly substrates near water, including beaches, islands, and gravel bars. In San Francisco Bay, has also nested on salt pond margins.	Unlikely. The Study Area does not contain sheltered gravel nesting or foraging habitat for this species. This species may be observed foraging within the vicinity of the Study Area, along Suisun Bay.
western snowy plover <i>Charadrius nivosus</i> <i>(alexandrines) nivosus</i>	FT, SSC, BCC	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	Unlikely. The Study Area does not contain beach, or shore habitat to support nesting or foraging of this species. The nearest suitable habitat is over 10 miles west towards the San Pablo Bay.
great blue heron <i>Ardea herodias</i>	none (breeding sites protected by CDFW)	Year-round resident. Nests colonially or semi-colonially in tall trees and on cliffs, also sequestered terrestrial substrates. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	Unlikely. The Study Area does not contain trees suitable to support a nesting colony. Additionally there are no documented rookeries within the Study Area or immediately adjacent area (CDFW 2017). This species may be observed foraging within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
great egret <i>Ardea alba</i>	none (breeding sites protected by CDFW)	Year-round resident. Nests colonially or semi-colonially, usually in trees, occasionally on the ground or elevated platforms. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	Unlikely. The Study Area does not contain trees suitable to support a nesting colony. Additionally there are no documented rookeries within the Study Area or immediately adjacent area (CDFW 2017). This species may be observed foraging within the Study Area.
Allen's hummingbird <i>Selasphorus sasin</i>	BCC	Summer resident along the California coast, breeding in a variety of woodland and forest habitats, including parks and gardens with abundant nectar sources. Nest in shrubs and trees with dense vegetation.	Unlikely. The Study Area does not provide suitable woodland or forest vegetation to support nesting or foraging for this species.
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	FT, SE, BCC	Summer resident, breeding in dense riparian forests and jungles, typically with early successional vegetation present. Utilizes densely-foliaged deciduous trees and shrubs. Eats mostly caterpillars. Current breeding distribution within California very restricted.	No potential. The Study Area does not contain suitable riparian forest habitat required for nesting or foraging by this species.
olive-sided flycatcher <i>Contopus cooperi</i>	SSC, BCC	Summer resident. Typical breeding habitat is montane coniferous forests. At lower elevations, also occurs in wooded canyons and mixed forests and woodlands. Often associated with forest edges. Arboreal nest sites located well off the ground.	Unlikely. This species is uncommon in the Delta and is more commonly found in the region in higher elevation portions of the coast ranges. Additionally, the Study Area does not contain forested communities to support nesting of this species.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
bank swallow <i>Riparia riparia</i>	ST	Summer resident in riparian and other lowland habitats near rivers, lakes and the ocean in northern California. Nests colonially in excavated burrows on vertical cliffs and bank cuts (natural and manmade) with fine-textured soils. Historical nesting range in southern and central areas of California has been eliminated by habitat loss. Currently known to breed in Siskiyou, Shasta, and Lassen Cos., portions of the north coast, and along Sacramento River from Shasta Co. south to Yolo Co.	No Potential. The Study Area and vicinity do not contain suitable riparian bank habitat for this species. The Study Area is outside the current known breeding range.
Nuttall's woodpecker <i>Picoides nuttallii</i>	BCC	Year-round resident in lowland woodlands throughout much of California west of the Sierra Nevada. Typical habitat is dominated by oaks; also occurs in riparian woodland. Nests in tree cavities.	Unlikely. The Study Area and immediately adjacent do not contain woodland trees with cavities suitable to support nesting or foraging of this species.
Lewis's woodpecker <i>Melanerpes lewis</i>	BCC	Uncommon resident in California occurring on open oak savannahs, broken deciduous and coniferous habitats. Breeds primarily in ponderosa pine forests, riparian woodlands and disturbed pine forests but is also known to nest in orchards and oak woodlands. Rare nester in the San Francisco Bay Area.	Unlikely. The Study Area and immediately adjacent do not contain trees suitable to support nesting or foraging of this species. This species predominately winters in the San Francisco Bay Area.
loggerhead shrike <i>Lanius ludovicianus</i>	BCC, SSC	Year-round resident in open woodland, grassland, savannah and scrub. Prefers areas with sparse shrubs, trees, posts, and other suitable perches for foraging. Preys upon large insects and small vertebrates. Nests are well-concealed in densely-foliaged shrubs or trees.	Unlikely. Although grassland foraging habitat is present within the Study Area, there are few shrubs or dense trees to support nesting.
oak titmouse <i>Baeolophus inornatus</i>	BCC	Occurs year-round in woodland and savannah habitats where oaks are present, as well as riparian areas. Nests in tree cavities.	Unlikely. The Study Area and immediately adjacent do not contain woodland trees with cavities suitable to support nesting or foraging of this species.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
yellow warbler <i>Setophaga (Dendroica) petechia brewsteri</i>	SSC, BCC	Summer resident throughout much of California. Breeds in riparian vegetation close to water, including streams and wet meadows. Microhabitat used for nesting variable, but dense willow growth is typical. Occurs widely on migration.	Unlikely. The Study Area and immediately adjacent areas do not contain riparian trees to support foraging or nesting by this species.
black-chinned sparrow <i>Spizella atrogularis</i>	BCC	Summer resident. Typically occurs on arid, rocky slopes with brushy vegetation, e.g. mixed chaparral and sagebrush.	Unlikely. The Study Area and immediately adjacent areas do not contain chaparral or scrub habitat to support nesting or foraging of this species.
grasshopper sparrow <i>Ammodramus savannarum</i>	SSC	Summer resident. Breeds in open grasslands in lowlands and foothills, generally with low- to moderate-height grasses and scattered shrubs. Well-hidden nests are placed on the ground.	Unlikely. The Study Area and immediately adjacent areas do not contain undisturbed grassland habitat to support nesting or foraging of this species. This species is predominately found in the Coast Range hills in the region.
Samuels (San Pablo) song sparrow <i>Melospiza melodia samuelis</i>	BCC, SSC	Year-round resident of tidal marshes along the north side of San Francisco and San Pablo Bays. Typical habitat is dominated by pickleweed, with gumplant and other shrubs present in the upper zone for nesting. May forage in areas adjacent to marshes.	No Potential. The Study Area is outside of the subspecies' known range.
Suisun song sparrow <i>Melospiza melodia maxillaris</i>	BCC, SSC	Year-round resident of brackish-water marshes along Suisun Bay. Inhabits cattails, tules, bulrushes and other emergent vegetation, including pickleweed. Nests typically placed in shrubs.	Present. Wetland emergent vegetation to support nesting and foraging of this species is present within the Study Area. This species is known from the vicinity and presumably present in wetland areas adjacent to the Study Area.
Lawrence's goldfinch <i>Spinus lawrencei</i>	BCC	Summer resident, primarily in southern California; generally uncommon and local. Typically found in arid open woodlands, including oak savannah. Breeding distribution is erratic from year to year.	Unlikely. This species typically inhabits open woodlands and oak savannah. Vegetation to support nesting and foraging of this species is not present within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
tricolored blackbird <i>Agelaius tricolor</i>	SSC, BCC	Nearly endemic to California, where it is most numerous in the Central Valley and vicinity. Highly colonial, nesting in dense aggregations over or near freshwater in emergent growth or riparian thickets. Also uses flooded agricultural fields. Abundant insect prey near breeding areas essential.	Unlikely Potential. The Study Area contains areas of inundation but no tall dense areas of vegetation that may support nesting of this species. This species has been documented within two miles west of the Study Area.
saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	BCC, SSC	Resident of the San Francisco Bay region, in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	Moderate Potential. The Study Area contains areas of inundation and associated marsh vegetation that may support nesting of this species. This species is known from the vicinity and is presumably present in wetland areas adjacent to the Study Area.
yellow-billed magpie <i>Pica nuttalli</i>	BCC	Endemic to the Central Valley and central Coast Ranges. Favors open park-like areas with expanses of open ground, including oak savannah, orchards, and along stream courses. Large, dome-shaped stick nests are placed in trees.	Unlikely. The Study Area does not contain woodland communities suitable for nesting. This species may be occasionally observed foraging within the Study Area.
Reptiles and Amphibians			
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	FT, ST	Inhabits chaparral and foothill-hardwood habitats in the eastern Bay Area. Prefers south-facing slopes and ravines with rock outcroppings where shrubs form a vegetative mosaic with oak trees and grasses and small mammal burrows provide basking and refuge.	No Potential. The Study Area is outside of the species' known range and does not contain suitable scrub or woodland habitat.
giant garter snake <i>Thamnophis gigas</i>	FT, ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	No Potential. The Study Area is west of this species' known range and does not contain suitable freshwater habitat.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Foothill yellow-legged frog <i>Rana boylei</i>	SE, SSC	Found in or adjacent to rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented occurrence is five miles southwest of the Study Area (CDFW 2021).
California red-legged frog <i>Rana draytonii</i>	FT, SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Associated with quiet perennial to intermittent ponds, stream pools and wetlands. Prefers shorelines with extensive vegetation. Disperses through upland habitats after rains.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented occurrence is four miles west of the Study Area (CDFW 2017)
California tiger salamander <i>Ambystoma californiense</i>	FE/FT, ST	Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented extant occurrence is four miles east of the Study
Blainville's (Coast) horned lizard <i>Phrynosoma blainvillii (coronatum)</i>	SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Prefers friable, rocky, or shallow sandy soils for burial; open areas for sunning; bushes for cover; and an abundant supply of ants and other insects.	Unlikely. The Study Area is presumably former bayland/wetland and existing conditions are marginal with a low potential for colonization, as urban development impedes colonization from existing populations.
silvery legless lizard <i>Anniella pulchra pulchra</i>	SSC	Fossorial species, inhabiting sandy or loose loamy soils under relatively sparse vegetation. Suitable habitat includes dunes, stream terraces, and scrub and chaparral. Adequate soil moisture is essential.	Unlikely. The Study Area is presumably former bayland/wetland and existing conditions are marginal with a low potential for colonization, as urban development impedes colonization from existing populations.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Pacific (western) pond turtle <i>Actinemys marmorata</i>	SSC	Thoroughly aquatic, inhabiting ponds, marshes, streams, and irrigation ditches with aquatic vegetation. Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks, and suitable upland habitat (sandy banks or grassy open fields) for egg-laying.	Moderate Potential. The Study Area contains aquatic features to support this species, with nearby brackish tidal sloughs and freshwater canals. The nearest documented occurrence is 0.5 miles west of the Study Area (CDFW 2017).
Fishes			
Pacific lamprey <i>Entosphenus (=Lampetra) tridentatus</i>	SSC	Spawns between March and July in gravel bottomed streams in riffle habitat. Larvae drift downstream to areas of low velocity and fine substrates and are relatively immobile in the stream substrates.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
river lamprey <i>Lampetra ayresi</i>	SSC	Lower Sacramento River, San Joaquin River and Russian River. May occur in coastal streams north of San Francisco Bay. Adults need clean, gravelly riffles, Ammocoetes need sandy backwaters or stream edges, good water quality and temps < 25 degrees C	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
green sturgeon <i>Acipenser medirostris</i>	FT, SSC	Anadromous. Spawns in the Sacramento and Klamath River systems. Lingering transients may be found throughout the San Francisco Bay Estuary, particularly juveniles.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
white sturgeon <i>Acipenser transmontanus</i>	SSC	Found in most estuaries along the Pacific coast. Adults in the San Francisco Bay Estuary system spawn in the Sacramento River and are not known to enter freshwater or non-tidal reaches of Estuary streams. Spawn May through June.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as rearing, and foraging habitat as well as providing a migratory corridor for this species. Spawning habitat for this species is not present within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Chinook salmon - Central Valley spring-run ESU <i>Oncorhynchus tshawytscha</i>	FT,ST, NMFS	Occurs in the Feather River and the Sacramento River and its tributaries, including Butte, Mill, Deer, Antelope and Beegum Creeks. Adults enter the Sacramento River from late March through September. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams from mid-August through early October. Juveniles migrate soon after emergence as young-of-the-year, or remain in freshwater and migrate as yearlings.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon – Sacramento winter-run ESU <i>Oncorhynchus tshawytscha</i>	FE, SE, NMFS	Occurs in the Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees C for spawning. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles typically migrate to the ocean soon after emergence from the gravel.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon - central valley fall/late fall-run ESU <i>Oncorhynchus tshawytscha</i>	SSC, NMFS	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Chinook salmon - California coastal ESU <i>Oncorhynchus tshawytscha</i>	FT	California Coastal Chinook Salmon ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River (exclusive) to the Russian River (inclusive). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. Water temps >27 degrees C lethal to adults.	No Potential. The Study Area does not occur within this ESU's range.
Coho salmon - central CA coast ESU <i>Oncorhynchus kisutch</i>	FE, SE	Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen.	No Potential. This species is extirpated from San Francisco Bay and its tributaries (NMFS 2012).
steelhead - central valley DPS <i>Oncorhynchus mykiss irideus</i>	FT, NMFS	Includes all naturally spawned populations (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries, excluding San Francisco and San Pablo bays and their tributaries. Preferred spawning habitat is in cool to cold perennial streams with high dissolved oxygen levels and fast flowing water. Abundant riffle areas for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. Near the southern end of the Study Area, Pacheco Creek meets Walnut Creek, which currently supports a population of this species (Leidy et al 2005). Therefore, this species must migrate past the Study Area and may rear within tidally influenced portions of the Delta and creek before migrating to the open ocean. No suitable freshwater spawning habitat is present.
steelhead - central CA coast DPS <i>Oncorhynchus mykiss irideus</i>	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area does not occur within this DPS's range.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
steelhead - south/central CA coast DPS <i>Oncorhynchus mykiss irideus</i>	FT	Occurs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area does not occur within this DPS's range.
Delta smelt <i>Hypomesus transpacificus</i>	FT, SE	Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
longfin smelt <i>Spirinchus thaleichthys</i>	FC, ST, SSC	Euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species for migration as well as rearing and foraging.
Sacramento perch <i>Archoplites interruptus</i>	SSC	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley. Prefer warm water. Aquatic vegetation is essential for young. Tolerate wide range of physio-chemical water conditions.	No Potential. This species is considered extirpated throughout its native range and now only exists in isolated waterbodies (i.e. lakes or ponds) where it has been introduced (Crain and Moyle 2011).
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	SSC	Formerly endemic to the lakes and rivers of the Central Valley, but now confined to the Sacramento Delta, Suisun Bay and associated marshes. Occurs in slow-moving river sections and dead-end sloughs. Requires flooded vegetation for spawning and foraging for young. A freshwater species, but tolerant of moderate salinity (10-18 parts per thousand).	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Invertebrates			
vernal pool andrenid bee <i>Andrena blennospermatis</i>	SSI	A solitary, ground-nesting bee found in upland areas near vernal pools. Its host plant is <i>Blennosperma</i> spp. and does not forage far from the host plant. Range is Contra Costa, El Dorado, Lake, Placer, Sacramento, San Joaquin, Solano, Sonoma, Tehama, and Yolo counties.	No Potential. The Study Area does not contain vernal pool habitat to support this species
Antioch andrenid bee <i>Perdita scitula antiochensis</i>	SSI	Occurs within the Antioch dunes. Visits flowers of <i>Eriogonum</i> spp., <i>Gutierrezia californica</i> , <i>Heterotheca grandiflora</i> , and <i>Lessingia glandulifera</i> .	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat or associated flowering plants.
Antioch Dunes halictid bee <i>Sphecodogastra antiochensis</i>	SSI	A rare, specialist foraging bee with a very restricted distribution—the Antioch Dunes of Contra Costa County, California.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
Antioch sphecid wasp <i>Philanthus nasalis</i>	SSI	Known only from the Antioch dunes of the Sacramento-San Joaquin Delta area, in the vicinity of Antioch, Contra Costa County. Also collected in Santa Cruz County.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
Antioch efferian robberfly <i>Efferia antiochi</i>	SSI	Known only from Antioch, Fresno, and Scout Island in the San Joaquin River.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
California linderiella <i>Linderiella occidentalis</i>	SSI	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity, and TDS.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is 0.6 mile west of the Study Area across Pacheco Creek (CDFW 2017).

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
conservancy fairy shrimp <i>Branchinecta conservatio</i>	FE, SSI	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	No Potential. The Study Area does not contain vernal pool habitat to support this species and is west of this species' known range. The nearest documented occurrence is over 10 miles northeast of the Study Area (CDFW 2017).
Longhorn fairy shrimp <i>Branchinecta longiantenna</i>	FE	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	No Potential. The Study Area does not contain vernal pool habitat to support this species.
vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FT, SSI	Endemic to the grasslands of the Central Valley, central coast mountains, and south coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is over 10 miles east of the Study Area (CDFW 2017).
vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE, SSI	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is over 15 miles northeast of the Study Area (CDFW 2017).
San Bruno elfin butterfly <i>Callophrys mossii bayensis</i>	FE, SSI	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, <i>Sedum spathulifolium</i> .	No Potential. The Study Area is outside this species' very limited extant range and does not contain rocky outcrops or coastal scrub to support the host plant.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
monarch butterfly <i>Danaus plexippus</i>	Winter roost sites protected by CDFW	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, Monterey cypress), with nectar and water sources nearby.	Unlikely. The Study Area does not contain groups of trees that would provide shelter from winds and extreme temperatures to support roosting. This species may forage within the Study Area.
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	FE, SSI	Two populations in San Bruno mountain and the Cordelia Hills are recognized. Hostplant is <i>Viola pedunculata</i> , which is found on serpentine soils. Most adults found on east-facing slopes; males congregate on hilltops in search of females.	No Potential. The Study Area does not contain serpentine soils to support this species' host plant, <i>Viola pedunculata</i> .
Lange's metalmark butterfly <i>Apodemia mormo langei</i>	FE, SSI	Inhabits stabilized dunes along the San Joaquin River. Endemic to Antioch Dunes, Contra Costa County. Primary host plant is <i>Eriogonum nudum</i> var. <i>auriculatum</i> ; feeds on nectar of other wildflowers, as well as host plant.	No Potential. The Study Area does not contain this species' host plant, <i>Eriogonum nudum</i> var. <i>auriculatum</i> .
Antioch Dunes anthicid beetle <i>Anthicus antiochensis</i>	SSI	<i>Anthicus antiochensis</i> is apparently extirpated from the type locality at Antioch Dunes (CDFW 2015). Stabilization of the dunes in the 1950s may have eliminated suitable habitat. It is also known at several sites along the Sacramento River in Glenn, Tehama, Shasta, and Solano Counties, and from one site at Nicolas on the Feather River in Sutter County.	No Potential. The Study Area is outside this species' locally restricted range in the Antioch Dunes, where it is considered extirpated.
Delta green ground beetle <i>Elaphrus viridis</i>	FT, SSI	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis Air Force Base. Prefers the sandy mud substrate where it slopes gently into the water, with low-growing vegetation, 25 to 100% cover.	No Potential. The Study Area does not contain vernal pool habitat to support this species, and it is outside of this species' known range. The nearest documented occurrence is 17 miles northeast of the Study Area (CDFW 2017).

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
molestan blister beetle <i>Lytta molesta</i>	SSI	Inhabits the Central Valley of California, from Contra Costa to Kern and Tulare counties. <i>Lytta molesta</i> has been collected on <i>Lupinus</i> spp., <i>Trifolium wormskioldii</i> in dried vernal pools, and on <i>Eriodium</i> spp. Appears to be absent in nearby areas with non-vernal pool vegetation, but a lack of detailed collecting information makes it unclear whether the species is always or usually associated with dried vernal pools.	No Potential. The Study Area is outside the known range of this species and does not contain vernal pool habitat.
San Joaquin dune beetle <i>Coelus gracilis</i>	SSI	Inhabits fossil dunes along the western edge of San Joaquin Valley; extirpated from Antioch Dunes (type locality). Inhabits sites containing sandy substrates.	Unlikely. The Study Area is outside this species' range.
valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT, SSI	Occurs only in the central valley of California, in association with blue elderberry (<i>Sambucus</i> spp.). Prefers to lay eggs in elderberry 2 to 8 inches in diameter; some preference shown for "stressed" elderberry.	No Potential. The Study Area does not contain blue elderberry to support this species, and is outside of this species' known range. The nearest documented occurrence is over 10 miles north of the Study Area (CDFW 2017).
western bumble bee <i>Bombus occidentalis</i>	SCE, SSI	Formerly common throughout much of western North America; populations from southern British Columbia to central California have nearly disappeared (Xerces 2017). Occurs in a wide variety of habitat types. Nests are constructed annually in pre-existing cavities, usually on the ground (e.g. mammal burrows). Many plant species are visited and pollinated.	Unlikely. This species is wide-ranging in California. The Study Area does not contain significant nectar sources and nesting substrates to support this species in any large concentration.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Plants			
bent-flowered fiddleneck <i>Amsinckia lunaris</i>	Rank 1B.2	Coastal bluff scrub, cismontane woodland, valley and foothill grassland. Elevation ranges from 10 to 1640 feet (3 to 500 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain coastal bluff scrub, cismontane woodland, and intact valley and foothill grassland. Likewise, this species is situated on rocky, colluvial or residual substrates, often derived from volcanic or ultramafic parent material; such substrates are absent from the Study Area, contemporarily and historically. Therefore, there is no potential for this species to occur within the Study Area.
California androsace <i>Androsace elongata ssp. acuta</i>	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, meadows and seeps, pinyon and juniper woodland, valley and foothill grassland. Elevation ranges from 490 to 3940 feet (150 to 1200 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain chaparral, coastal scrub, meadows and seeps, pinyon and juniper woodland, cismontane woodland, and intact, native valley and foothill grassland. Therefore, there is no potential for this species to occur within the Study Area.
slender silver moss <i>Anomobryum julaceum</i>	Rank 4.2	Broadleafed upland forest, lower montane coniferous forest, north coast coniferous forest/damp rock and soil on outcrops, usually on roadcuts. Elevation ranges from 330 to 3280 feet (100 to 1000 meters).	No Potential. The Study Area does not contain broadleafed upland forest, north coast coniferous forest/damp rock and soil on outcrops, roadcuts, and lower montane coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
coast rockcress <i>Arabis blepharophylla</i>	Rank 4.3	Broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub/rocky. Elevation ranges from 10 to 3610 feet (3 to 1100 meters). Blooms Feb-May.	No Potential. The Study Area does not contain broadleafed upland forest, coastal bluff scrub, coastal prairie, and coastal scrub/rocky. This species occurs on bluff faces, rock crevices, and downhill talus of rock outcrops which are absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Mt. Diablo manzanita <i>Arctostaphylos auriculata</i>	Rank 1B.3	Chaparral (sandstone), cismontane woodland. Elevation ranges from 440 to 2130 feet (135 to 650 meters). Blooms Jan-Mar.	No Potential. The Study Area does not contain cismontane woodland or chaparral (sandstone). Therefore, there is no potential for this species to occur within the Study Area.
Contra Costa manzanita <i>Arctostaphylos manzanita ssp. laevigata</i>	Rank 1B.2	Chaparral (rocky). Elevation ranges from 1410 to 3610 feet (430 to 1100 meters). Blooms Jan-Mar (Apr).	No Potential. The Study Area does not contain chaparral (rocky). Therefore, there is no potential for this species to occur within the Study Area.
pallid manzanita <i>Arctostaphylos pallida</i>	FT, SE, Rank 1B.1	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub/siliceous shale, sandy or gravelly. Elevation ranges from 610 to 1530 feet (185 to 465 meters). Blooms Dec-Mar.	No Potential. The Study Area does not contain broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, coastal scrub/siliceous shale, sandy or gravelly. Therefore, there is no potential for this species to occur within the Study Area.
alkali milk-vetch <i>Astragalus tener var. tener</i>	Rank 1B.2	Playas, valley and foothill grassland (adobe clay), vernal pools/alkaline. Elevation ranges from 0 to 200 feet (1 to 60 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
heartscale <i>Atriplex cordulata var. cordulata</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland (sandy)/saline or alkaline. Elevation ranges from 0 to 1840 feet (0 to 560 meters). Blooms Apr-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area. Furthermore, highly localized seed sources for colonization of the site are lacking. Therefore, there is an unlikely potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
crownscale <i>Atriplex coronata</i> var. <i>coronata</i>	Rank 4.2	Chenopod scrub, valley and foothill grassland, vernal pools/alkaline, often clay. Elevation ranges from 0 to 1940 feet (1 to 590 meters). Blooms Mar-Oct.	Moderate. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area.
brittlescale <i>Atriplex depressa</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland, vernal pools/alkaline, clay. Elevation ranges from 0 to 1050 feet (1 to 320 meters). Blooms Apr-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from highly alkali chenopod scrub, meadow, grassland (mesic), and intact vernal pool complex habitats that are lacking in the Study Area. Furthermore, highly localized seed sources for colonization of the site are lacking. Therefore, there is an unlikely potential for this species to occur within the Study Area.
vernal pool smallscale <i>Atriplex persistens</i>	Rank 1B.2	Vernal pools (alkaline). Elevation ranges from 30 to 380 feet (10 to 115 meters). Blooms Jun-Oct.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from intact, alkali vernal pool and playa complexes. Highly localized seed sources to colonize the Study Area are lacking. Therefore, there is an unlikely potential for this species to occur within the Study Area.
big-scale balsamroot <i>Balsamorhiza macrolepis</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/sometimes serpentine. Elevation ranges from 300 to 5100 feet (90 to 1555 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain woodland, chaparral, or rocky, serpentine/volcanic grassland in a hilly setting necessary to support this species.
big tarplant <i>Blepharizonia plumosa</i>	Rank 1B.1	Valley and foothill grassland/usually clay.. Elevation ranges from 100 to 1660 feet (30 to 505 meters). Blooms Jul-Oct.	Unlikely. The Study Area does not contain intact naturally occurring grasslands underlain by clay substrates necessary to support this species. Therefore, there is an unlikely potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Brewer's calandrinia <i>Calandrinia breweri</i>	Rank 4.2	Chaparral, coastal scrub/sandy or loamy, disturbed sites and burns. Elevation ranges from 30 to 4000 feet (10 to 1220 meters). Blooms (Jan), Mar-Jun.	No Potential. The Study Area does not contain scrub or chaparral habitat, nor does it contain recently burned areas.
round-leaved filaree <i>California macrophylla</i>	Rank 1B.2	Cismontane woodland, valley and foothill grassland/clay. Elevation ranges from 50 to 3940 feet (15 to 1200 meters). Blooms Mar-May.	Unlikely. The Study Area does not contain intact naturally occurring grasslands underlain by clay substrates necessary to support this species. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Mt. Diablo fairy-lantern <i>Calochortus pulchellus</i>	Rank 1B.2	Chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. Elevation ranges from 100 to 2760 feet (30 to 840 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral, riparian woodland, cismontane woodland, valley and foothill grassland. Therefore, there is no potential for this species to occur within the Study Area.
Tiburon mariposa-lily <i>Calochortus tiburonensis</i>	FT, ST, Rank 1B.1	Valley and foothill grassland. On open, rocky, slopes in serpentine grassland. 50-150 m.	No potential. The Study Area does not contain valley and foothill grassland (Serpentine). Therefore, there is no potential for this species to occur within the Study Area.
Oakland star-tulip <i>Calochortus umbellatus</i>	Rank 4.2	Broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/often serpentine. Elevation ranges from 330 to 2300 feet (100 to 700 meters). Blooms Mar-May.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, cismontane woodland, lower montane coniferous forest, valley and foothill grassland/ often serpentine. Therefore, there is no potential for this species to occur within the Study Area.
chaparral harebell <i>Campanula exigua</i>	Rank 1B.2	Chaparral (rocky, usually serpentine). Elevation ranges from 900 to 4100 feet (275 to 1250 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral (rocky, usually serpentine). Therefore, there is no potential for this species to occur within the Study Area.

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(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Lyngbye's sedge <i>Carex lyngbye</i>	Rank 2B.2	Marshes and swamps (brackish or freshwater). 0-200 m.	Unlikely. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass), it is not connected to open tidal or muted tidal activity (i.e., marsh plain). Nearest occurrence is 15 miles distant in Solano County on Rush Ranch so seed sources are limited from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Tiburon paintbrush <i>Castilleja affinis var. neglecta</i>	FE, ST, Rank 1B.2	Valley and foothill grassland (serpentine). Elevation ranges from 200 to 1310 feet (60 to 400 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain valley and foothill grassland (serpentine). Therefore, there is no potential for this species to occur within the Study Area.
johnny-nip <i>Castilleja ambigua var. ambigua</i>	Rank 4.2	Coastal bluff scrub, coastal prairie, coastal scrub, marshes and swamps, valley and foothill grassland, vernal pool margins. Elevation ranges from 0 to 1430 feet (0 to 435 meters). Blooms Mar-Aug.	No Potential. The Study Area does not contain scrub, prairie, freshwater seasonal marsh, intact vernal pool complex, or naturally occurring grassland habitats necessary to support this species.
holly-leaved ceanothus <i>Ceanothus purpureus</i>	Rank 1B.2	Chaparral, cismontane woodland/volcanic, rocky. Elevation ranges from 390 to 2100 feet (120 to 640 meters). Blooms Feb-Jun.	No Potential. The Study Area does not contain chaparral and cismontane woodland/volcanic (rocky). Therefore, there is no potential for this species to occur within the Study Area.
Congdon's tarplant <i>Centromadia parryi ssp. congdonii</i>	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 750 feet (0 to 230 meters). Blooms May-Oct (Nov).	High. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area. Additionally, there are documented occurrences approximately one mile distant from the Study Area that could provide a viable seed source.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
pappose tarplant <i>Centromadia parryi</i> ssp. <i>parryi</i>	Rank 1B.2	Chaparral, coastal prairie, meadows and seeps, marshes and swamps (coastal salt), valley and foothill grassland (vernally mesic)/often alkaline. Elevation ranges from 0 to 1380 feet (0 to 420 meters). Blooms May-Nov.	Moderate. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area.
Parry's rough tarplant <i>Centromadia parryi</i> ssp. <i>rudis</i>	Rank 4.2	Valley and foothill grassland, vernal pools/alkaline, vernal mesic, seeps, sometimes roadsides. Elevation ranges from 0 to 330 feet (0 to 100 meters). Blooms May-Oct.	Moderate. Although the Study Area does not contain naturally occurring grassland habitat, this species is tolerant of disturbance and readily sets an abundance of seed that has the potential to colonize and establish in limited portions of the Study Area.
hispid bird's-beak <i>Chloropyron molle</i> ssp. <i>hispidum</i>	Rank 1B.1	Meadows and seeps, playas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 510 feet (1 to 155 meters). Blooms Jun-Sep.	Unlikely. Although the Study Area contains seasonal wetlands, this species is closely associated with intact alkali vernal pool-grassland complexes which are absent from the Study Area. Likewise, there is no localized seed sources for colonization of the site. Therefore, there is an unlikely potential for this species to occur within the Study Area.
soft bird's-beak <i>Chloropyron molle</i> ssp. <i>molle</i>	FE, SR, Rank 1B.2	Marshes and swamps (coastal salt). Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms Jul-Nov.	Unlikely. Although the Study Area contains elements of brackish marsh vegetation (e.g., salt grass, pickleweed); however, these areas do not contain tidal hydrology necessary to support this species. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Bolander's water-hemlock <i>Cicuta maculata</i> var. <i>bolanderi</i>	Rank 2B.1	Marshes and swampscoastal, fresh or brackish water. Elevation ranges from 0 to 660 feet (0 to 200 meters). Blooms Jul-Sep.	Unlikely. Although the Study Area contains brackish marsh that may support this species, it lacks perennial hydrology.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Franciscan thistle <i>Cirsium andrewsii</i>	Rank 1B.2	Broadleaved upland forest, coastal bluff scrub, coastal prairie, coastal scrub/mesic, sometimes serpentine. Elevation ranges from 0 to 490 feet (0 to 150 meters). Blooms Mar-Jul.	No Potential. The Study Area does not contain broadleaved upland forest, coastal bluff scrub, coastal prairie, and coastal scrub/mesic sometimes serpentine. Therefore, there is no potential for this species to occur within the Study Area.
Suisun thistle <i>Cirsium hydrophilum var. hydrophilum</i>	FE, Rank 1B.1	Marshes and swamps (salt). Elevation ranges from 0 to 0 feet (0 to 1 meters). Blooms Jun-Sep.	Unlikely. Although the Study Area does contain elements of salt marsh vegetation, this species typically occurs within tidal influenced salt marsh habitat. Given the site is disconnected from active tidal influence. The Study Area is unlikely to support this species.
serpentine collomia <i>Collomia diversifolia</i>	Rank 4.3	Chaparral, cismontane woodland/serpentine, rocky or gravelly. Elevation ranges from 980 to 1970 feet (300 to 600 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Likewise, this species occurs on rocky, gravelly serpentine substrate that is absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo bird's-beak <i>Cordylanthus nidularius</i>	SR, Rank 1B.1	Chaparral (serpentine). Elevation ranges from 1970 to 2620 feet (600 to 800 meters). Blooms Jun-Aug.	No Potential. The Study Area does not contain chaparral. Likewise, this species is a serpentine endemic; serpentine substrate is absent from the Study Area. Therefore, there is no potential for this species to occur within the Study Area.
Hospital Canyon larkspur <i>Delphinium californicum ssp. interius</i>	Rank 1B.2	Chaparral (openings), cismontane woodland (mesic), coastal scrub. Elevation ranges from 640 to 3590 feet (195 to 1095 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
western leatherwood <i>Dirca occidentalis</i>	Rank 1B.2	Broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, riparian woodland/mesic. Elevation ranges from 80 to 1390 feet (25 to 425 meters). Blooms Jan-Mar (Apr).	No Potential. The Study Area does not contain broadleafed upland forest, closed-cone coniferous forest, chaparral, cismontane woodland, north coast coniferous forest, riparian forest, or riparian woodland. Therefore, there is no potential for this species to occur within the Study Area.
dwarf downingia <i>Downingia pusilla</i>	Rank 2B.2	Valley and foothill grassland (mesic), vernal pools. Elevation ranges from 0 to 1460 feet (1 to 445 meters). Blooms Mar-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
small spikerush <i>Eleocharis parvula</i>	Rank 4.3	Marshes and swamps. Elevation ranges from 0 to 9910 feet (1 to 3020 meters). Blooms (Apr), Jun-Aug (Sep).	Unlikely. Although the Study Area does contain elements of marsh vegetation, it occurs along steep man-made channels and is disconnected from tidal influence. This species grows in undisturbed tidal habitat and the Study Area is entirely disturbed. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Lime Ridge eriastrum <i>Eriastrum ertterae</i>	Rank 1B.1	Chaparral (openings or edges)/alkaline or semi-alkaline, sandy.. Elevation ranges from 660 to 950 feet (200 to 290 meters). Blooms Jun-Jul.	No Potential. The Study Area does not contain chaparral. Therefore, there is no potential for this species to occur within the Study Area.
streamside daisy <i>Erigeron biolettii</i>	Rank 3	Broadleafed upland forest, cismontane woodland, north coast coniferous forest/rocky, mesic. Elevation ranges from 100 to 3610 feet (30 to 1100 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain broadleafed upland forest, cismontane woodland, or north coast coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Tiburon buckwheat <i>Eriogonum luteolum var. caninum</i>	Rank 1B.2	Chaparral, cismontane woodland, coastal prairie, valley and foothill grassland/serpentine, sandy to gravelly. Elevation ranges from 0 to 2300 feet (0 to 700 meters). Blooms May-Sep.	No Potential. The Study Area does not contain coastal prairie, valley and foothill grassland/serpentine, chaparral, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo buckwheat <i>Eriogonum truncatum</i>	Rank 1B.1	Chaparral, coastal scrub, valley and foothill grassland/sandy. Elevation ranges from 10 to 1150 feet (3 to 350 meters). Blooms Apr-Sep (Nov), (Dec).	No Potential. The Study Area does not contain coastal scrub or chaparral, and the herbaceous communities are not intact native grassland. Furthermore, the Study Area substrate is not sandy.
Jepson's woolly sunflower <i>Eriophyllum jepsonii</i>	Rank 4.3	Chaparral, cismontane woodland, coastal scrub/sometimes serpentine. Elevation ranges from 660 to 3360 feet (200 to 1025 meters). Blooms Apr-Jun.	No Potential. The Study Area does not contain chaparral, cismontane woodland, or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Jepson's coyote thistle <i>Eryngium jepsonii</i>	Rank 1B.2	Vernal pools, valley and foothill grassland. Elevation range from 10 to 975 feet (3 to 300 meters). Blooms Apr-Aug.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Contra Costa wallflower <i>Erysimum capitatum var. angustatum</i>	FE, SE, Rank 1B.1	Inland dunes. Elevation ranges from 10 to 70 feet (3 to 20 meters). Blooms Mar-Jul.	No Potential. The Study Area does not contain aeolian or inland dune habitat necessary to support this species. This species is highly restricted to the Antioch Dunes.
San Joaquin spearscale <i>Extriplex joaquinana</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, playas, valley and foothill grassland/alkaline. Elevation ranges from 0 to 2740 feet (1 to 835 meters). Blooms Apr-Oct.	Moderate. Although the Study Area does not contain intact playa or alkali grassland, this species is somewhat tolerant of disturbance and there is a seed source less than 0.5 mile distant.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
minute pocket moss <i>Fissidens pauperculus</i>	Rank 1B.2	North coast coniferous forest (damp coastal soil). Elevation ranges from 30 to 3360 feet (10 to 1024 meters).	No Potential. The Study Area does not contain north coast coniferous forest. Therefore, there is no potential for this species to occur within the Study Area.
fragrant fritillary <i>Fritillaria liliacea</i>	Rank 1B.2	Cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland/often serpentine. Elevation ranges from 10 to 1350 feet (3 to 410 meters). Blooms Feb-Apr.	No Potential. The Study Area does not contain woodland, prairie, scrub, or intact, native grassland habitat. Furthermore, this species is known from undisturbed rocky, clay substrates derived from volcanics or serpentine.
Toren's grimmia <i>Grimmia torenii</i>	Rank 1B.3	Chaparral, cismontane woodland, lower montane coniferous forest/openings, rocky, boulder and rock walls, carbonate, volcanic. Elevation ranges from 1070 to 3810 feet (325 to 1160 meters).	No Potential. The Study Area does not contain chaparral lower montane coniferous forest, rocky, boulders, rock walls, carbonate, or volcanic rock. Therefore, there is no potential for this species to occur within the Study Area.
Diablo helianthella <i>Helianthella castanea</i>	Rank 1B.2	Broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland/usually rocky, axonal soils. often in partial shade. Elevation ranges from 200 to 4270 feet (60 to 1300 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, coastal scrub, valley and foothill grassland/ rocky, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Brewer's western flax <i>Hesperolinon breweri</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/usually serpentine. Elevation ranges from 100 to 3100 feet (30 to 945 meters). Blooms May-Jul.	No Potential. The Study Area does not contain chaparral, valley and foothill grassland/ usually serpentine, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Santa Cruz tarplant <i>Holocarpha macradenia</i>	FT, SE, Rank 1B.1	Coastal prairie, coastal scrub, valley and foothill grassland/often clay, sandy. Elevation ranges from 30 to 720 feet (10 to 220 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain coastal prairie, coastal scrub, valley and foothill grassland/ often clay, or sandy. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
coast iris <i>Iris longipetala</i>	Rank 4.2	Coastal prairie, lower montane coniferous forest, meadows and seeps/mesic. Elevation ranges from 0 to 1970 feet (0 to 600 meters). Blooms Mar-May.	No Potential. The Study Area does not contain coastal prairie, lower montane coniferous forest, meadows, and seeps. Therefore, there is no potential for this species to occur within the Study Area.
Carquinez goldenbush <i>Isocoma arguta</i>	Rank 1B.1	Valley and foothill grassland (alkaline). Elevation ranges from 0 to 70 feet (1 to 20 meters). Blooms Aug-Dec.	No Potential. The Study Area does not contain undisturbed, intact, native alkali grasslands necessary to support this species.
Southern California black walnut <i>Juglans californica</i>	Rank 4.2	Chaparral, cismontane woodland, coastal scrub, riparian woodland/alluvial. Elevation ranges from 160 to 2950 feet (50 to 900 meters). Blooms Mar-Aug.	No Potential. The Study Area does not contain chaparral, cismontane woodland, coastal scrub, or riparian woodland/alluvial. Therefore, there is no potential for this species to occur within the Study Area.
Contra Costa goldfields <i>Lasthenia conjugens</i>	FE, Rank 1B.1	Cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools/mesic. Elevation ranges from 0 to 1540 feet (0 to 470 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Ferris' goldfields <i>Lasthenia ferrisiae</i>	Rank 4.2	Vernal pools (alkaline, clay). Elevation ranges from 70 to 2300 feet (20 to 700 meters). Blooms Feb-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Coulter goldfields <i>Lasthenia glabrata ssp. coulteri</i>	Rank 1B.1	alkaline soils in playas, sinks, grasslands, marshes, swamps, and vernal pools at elevations ranging from 0 to 4000 feet. Blooms Feb-June	Unlikely Potential. Soils, seasonal wetlands and grasslands in Study Area are disturbed. Assesed due to an unconfirmed occurrence of this species was documented by Z. Akulova near Walnut Creek, east of

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Delta tule pea <i>Lathyrus jepsonii</i> var. <i>jepsonii</i>	Rank 1B.2	Marshes and swamps (freshwater and brackish). Elevation ranges from 0 to 20 feet (0 to 5 meters). Blooms May-Jul (Aug), (Sep).	Unlikely. The Study Area is adjacent to tidal areas that may support this species; however, these are absent within the Study Area and there is significant disturbance in the Study Area.
legenere <i>Legenere limosa</i>	Rank 1B.1	Vernal pools. Elevation ranges from 0 to 2890 feet (1 to 880 meters). Blooms Apr-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Jepson's leptosiphon <i>Leptosiphon jepsonii</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland. Open to partially shaded grassy slopes. On volcanics or the periphery of serpentine substrates. 55-855 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
woolly-headed lessingia <i>Lessingia hololeuca</i>	Rank 3	Broadleafed upland forest, coastal scrub, lower montane coniferous forest, valley and foothill grassland/clay, serpentine. Elevation ranges from 50 to 1000 feet (15 to 305 meters). Blooms Jun-Oct.	No Potential. The Study Area does not contain scrub, forest, or intact, undisturbed grassland necessary to support this species. Furthermore, the Study Area does not contain serpentine clay substrate.
Mason's lilaepsis <i>Lilaepsis masonii</i>	SR, Rank 1B.1	Marshes and swamps (brackish or freshwater), riparian scrub. Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms Apr-Nov.	Unlikely. Although the Study Area contains elements of marsh habitat, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs with direct tidal action. Therefore, it is unlikely for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Delta mudwort <i>Limosella australis</i>	Rank 2B.1	Marshes and swamps (freshwater or brackish), riparian scrub/usually mud banks. Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms May-Aug.	Unlikely. Although the Study Area contains elements of marsh habitat, this species occurs in the splash zone of Suisun Bay and associated sizable sloughs and mud flats with direct tidal action. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Showy golden madia <i>Madia radiata</i>	Rank 1B.1	Valley and foothill grassland, cismontane woodland. Mostly on adobe clay in grassland or among shrubs. 75-1220 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
Hall's bush-mallow <i>Malacothamnus hallii</i>	Rank 1B.2	Chaparral, coastal scrub. Elevation ranges from 30 to 2490 feet (10 to 760 meters). Blooms May-Sep (Oct).	No Potential. The Study Area does not contain chaparral or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Oregon meconella <i>Meconella oregana</i>	Rank 1B.1	Coastal prairie, coastal scrub. Elevation ranges from 820 to 2030 feet (250 to 620 meters). Blooms Mar-Apr.	No Potential. The Study Area does not contain chaparral or coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo cottonweed <i>Micropus amphibolus</i>	Rank 3.2	Broadleafed upland forest, chaparral, cismontane woodland, valley and foothill grassland/rocky. Elevation ranges from 150 to 2710 feet (45 to 825 meters). Blooms Mar-May.	No Potential. The Study Area does not contain broadleafed upland forest, chaparral, valley and foothill grassland/ rocky, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
marsh microseris <i>Microseris paludosa</i>	Rank 1B.2	Closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. Elevation ranges from 20 to 1160 feet (5 to 355 meters). Blooms Apr-Jun (Jul).	No Potential. The Study Area does not contain closed-cone coniferous forest, undisturbed valley and foothill grassland, coastal scrub, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Antonio Hills monardella <i>Monardella antonina ssp. antonina</i>	Rank 3	Chaparral, cismontane woodland. Elevation ranges from 1050 to 3280 feet (320 to 1000 meters). Blooms Jun-Aug.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
woodland woollythreads <i>Monolopia gracilens</i>	Rank 1B.2	Broadleafed upland forest (openings), chaparral (openings), cismontane woodland, north coast coniferous forest (openings), valley and foothill grassland/serpentine. Elevation ranges from 330 to 3940 feet (100 to 1200 meters). Blooms (Feb), Mar-Jul.	No Potential. The Study Area does not contain north coast coniferous forest, broadleafed upland forest, chaparral, undisturbed valley and foothill grassland, or cismontane woodland. Furthermore, the Study Area lacks serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
little mousetail <i>Myosurus minimus ssp. apus</i>	Rank 3.1	Valley and foothill grassland, vernal pools (alkaline). Elevation ranges from 70 to 2100 feet (20 to 640 meters). Blooms Mar-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
Lime Ridge navarretia <i>Navarretia gowenii</i>	Rank 1B.1	Chaparral. Elevation ranges from 590 to 1000 feet (180 to 305 meters). Blooms May-Jun.	No Potential. The Study Area does not contain chaparral. Therefore, there is no potential for this species to occur within the Study Area.
Baker's navarretia <i>Navarretia leucocephala ssp. bakeri</i>	Rank 1B.1	Cismontane woodland, lower montane coniferous forest, meadows and seeps, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 20 to 5710 feet (5 to 1740 meters). Blooms Apr-Jul.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Colusa grass <i>Neostapfia colusana</i>	FT, SE, Rank 1B.1	Vernal pools. Usually in the bottoms of large or deep vernal pools; adobe soils. 5-125 m.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Antioch Dunes evening-primrose <i>Oenothera deltoides ssp. howellii</i>	FE, SE, Rank 1B.1	Inland dunes. Elevation ranges from 0 to 100 feet (0 to 30 meters). Blooms Mar-Sep.	No Potential. The Study Area does not contain aeolian or inland dune habitat necessary to support this species. This species is highly restricted to the Antioch Dunes.
White-rayed pentachaeta <i>Pentachaeta bellidiflora</i>	FE, SE, Rank 1B.1	Valley and foothill grassland, cismontane woodland. Open dry rocky slopes and grassy areas, often on soils derived from serpentine bedrock. 35-610 m.	No potential. The Study Area does not contain the habitat or the soils required by this species. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo phacelia <i>Phacelia phacelioides</i>	Rank 1B.2	Chaparral, cismontane woodland/rocky. Elevation ranges from 1640 to 4490 feet (500 to 1370 meters). Blooms Apr-May.	No Potential. The Study Area does not contain chaparral or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
bearded popcornflower <i>Plagiobothrys hystriculus</i>	Rank 1B.1	Valley and foothill grassland (mesic), vernal poolsmargins/often vernal swales. Elevation ranges from 0 to 900 feet (0 to 274 meters). Blooms Apr-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Marin knotweed <i>Polygonum marinense</i>	Rank 3.1	Marshes and swamps (coastal salt or brackish). Elevation ranges from 0 to 30 feet (0 to 10 meters). Blooms (Apr), May-Aug (Oct).	Unlikely. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass), it is not connected to open tidal or muted tidal activity (i.e., marsh plain). Therefore, there is an unlikely potential for this species to occur within the Study Area.
California alkali grass <i>Puccinellia simplex</i>	Rank 1B.2	Chenopod scrub, meadows and seeps, valley and foothill grassland, vernal pools/alkaline, vernal mesic; sinks, flats, and lake margins. Elevation ranges from 10 to 3050 feet (2 to 930 meters). Blooms Mar-May.	Unlikely. Although the Study Area contains seasonal wetlands which have a hydroperiod similar to vernal pools, this species is restricted to intact, interior alkali vernal pool complexes which are absent from the Study Area. Therefore, there is an unlikely potential for this species to occur within the Study Area.
Lobb's aquatic buttercup <i>Ranunculus lobbii</i>	Rank 4.2	Cismontane woodland, north coast coniferous forest, valley and foothill grassland, vernal pools/mesic. Elevation ranges from 50 to 1540 feet (15 to 470 meters). Blooms Feb-May.	No Potential. The Study Area does not contain north coast coniferous forest, valley and foothill grassland, vernal pools, or cismontane woodland. Restricted to freshwater pools of approximately six inches or greater in depth. Therefore, there is no potential for this species to occur within the Study Area.
rock sanicle <i>Sanicula saxatilis</i>	SR, Rank 1B.2	Broadleafed upland forest, chaparral, valley and foothill grassland/rocky. Elevation ranges from 2030 to 3850 feet (620 to 1175 meters). Blooms Apr-May.	No Potential. The Study Area does not contain broadleafed upland forest, undisturbed grassland, or chaparral. Furthermore, the Study Area does not contain rocky substrates necessary to support this species. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
chaparral ragwort <i>Senecio aphanactis</i>	Rank 2B.2	Chaparral, cismontane woodland, coastal scrub/sometimes alkaline. Elevation ranges from 50 to 2620 feet (15 to 800 meters). Blooms Jan-Apr.	No Potential. The Study Area does not contain north coast coniferous forest, undisturbed valley and foothill grassland, vernal pools, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
long-styled sand-spurrey <i>Spergularia macrotheca var. longistyla</i>	Rank 1B.2	Alkali seasonal marshes, mud flats, alkali meadows, and alkali hot springs. Elevation ranges from 0 to 830 feet (0 to 255 meters). Blooms Feb-May.	Unlikely. Although the Study Area contains seasonal wetlands, this species is closely associated with intact, highly alkali habitats absent from the Study Area. Therefore, there is an unlikely potential for this species to occur within the Study Area.
most beautiful jewelflower <i>Streptanthus albidus ssp. peramoenus</i>	Rank 1B.2	Chaparral, cismontane woodland, valley and foothill grassland/serpentine. Elevation ranges from 310 to 3280 feet (95 to 1000 meters). Blooms (Mar), Apr-Sep (Oct).	No Potential. The Study Area does not contain chaparral, valley and foothill grassland, or cismontane woodland. The Study Area does not contain serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
Mt. Diablo jewelflower <i>Streptanthus hispidus</i>	Rank 1B.3	Chaparral, valley and foothill grassland/rocky. Elevation ranges from 1200 to 3940 feet (365 to 1200 meters). Blooms Mar-Jun.	No Potential. The Study Area does not contain chaparral, valley and foothill grassland, or cismontane woodland. The Study Area does not contain serpentine substrate. Therefore, there is no potential for this species to occur within the Study Area.
slender-leaved pondweed <i>Stuckenia filiformis ssp. alpina</i>	Rank 2B.2	Marshes and swamps (assorted shallow freshwater). Elevation ranges from 980 to 7050 feet (300 to 2150 meters). Blooms May-Jul.	Unlikely. Although the Study Area contains a brackish marsh feature, the brackish water likely precludes the presence of this submerged, freshwater species. Therefore, there is an unlikely potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California seablite <i>Suaeda californica</i>	FE, Rank 1B.1	Marshes and swamps. Margins of coastal salt marshes. 0-5 m.	Unlikely. Although the Study Area does contain elements of salt marsh vegetation (e.g., pickleweed, salt grass), it is not connected to open tidal or muted tidal activity (i.e., marsh plain). Closest documented occurrence is 18 miles away near the City of Richmond, last seen in 1912 and presumed extirpated (CDFW 2021). Extant occurrences 25 miles distant (CDFW 2021) so seed sources are absent from the immediate vicinity. Therefore, there is an unlikely potential for this species to occur.
Suisun Marsh aster <i>Symphyotrichum lentum</i>	Rank 1B.2	Marshes and swamps (brackish and freshwater). Elevation ranges from 0 to 10 feet (0 to 3 meters). Blooms (Apr), May-Nov.	High Potential. The Study Area contains brackish marsh habitat that may support this species. Additionally, this species is relatively tolerant of disturbance. However, these are extremely limited within the Study Area. Likewise, there are documented extant occurrences less than 0.5 mile distant from the Study Area.
saline clover <i>Trifolium hydrophilum</i>	Rank 1B.2	Marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Elevation ranges from 0 to 980 feet (0 to 300 meters). Blooms Apr-Jun.	Unlikely. Although the Study Area contains seasonal wetlands, this species is known from natural, intact vernal pool complexes. Seed sources are limited or absent from the immediate vicinity.
coastal triquetrella <i>Triquetrella californica</i>	Rank 1B.2	Coastal bluff scrub, coastal scrub/soil. Elevation ranges from 30 to 330 feet (10 to 100 meters).	No Potential. The Study Area does not contain coastal bluff scrub and coastal scrub. Therefore, there is no potential for this species to occur within the Study Area.
caper-fruited tropidocarpum <i>Tropidocarpum capparideum</i>	Rank 1B.1	Valley and foothill grassland (alkaline hills). Elevation ranges from 0 to 1490 feet (1 to 455 meters). Blooms Mar-Apr.	No Potential. The Study Area does not contain alkali hilly grasslands necessary to support this species. Therefore, there is no potential for this species to occur within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
oval-leaved viburnum <i>Viburnum ellipticum</i>	Rank 2B.3	Chaparral, cismontane woodland, lower montane coniferous forest. Elevation ranges from 710 to 4590 feet (215 to 1400 meters). Blooms May-Jun.	No Potential. The Study Area does not contain lower montane coniferous forest, chaparral, or cismontane woodland. Therefore, there is no potential for this species to occur within the Study Area.
Mammals			
pallid bat <i>Antrozous pallidus</i>	SSC, WBWG	Found in deserts, grasslands, shrublands, woodlands, and forests. Most common in open, forages along river channels. Roost sites include crevices in rocky outcrops and cliffs, caves, mines, trees and various human structures such as bridges, barns, and buildings (including occupied buildings). Roosts must protect bats from high temperatures. Very sensitive to disturbance of roosting sites.	Unlikely. The Study Area does not contain any large trees with cavities or undisturbed buildings to support roosting. This species may be observed foraging within the Study Area, but it is unlikely to roost there. The nearest documented occurrence is four miles from the Study Area (CDFW 2017).
Townsend's big-eared bat <i>Corynorhinus townsendii</i>	SSC, WBWG	This species is associated with a wide variety of habitats from deserts to mid-elevation mixed coniferous-deciduous forest. Females form maternity colonies in buildings, caves and mines and males roost singly or in small groups. Foraging occurs in open forest habitats where they glean moths from vegetation.	Unlikely. This species is sensitive to disturbance and no caves, mines, or other undisturbed, suitable roost habitat is present in the Study Area or vicinity. The Study Area does not contain the forested communities this species prefers. The nearest documented occurrence is 6.5 miles from the Study Area (CDFW 2017).
western red bat <i>Lasiurus blossevillii</i>	SSC, WBWG	This species is typically solitary, roosting primarily in the foliage of trees or shrubs. Day roosts are commonly in edge habitats adjacent to streams or open fields, in orchards, and sometimes in urban areas. There may be an association with intact riparian habitat (particularly willows, cottonwoods, and sycamores).	Unlikely. The Study Area does not contain riparian habitat with large trees to support roosting for this species. This species may be observed foraging within the Study Area, but it is unlikely to roost there.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
hoary bat <i>Lasiurus cinereus</i>	WBWG	Prefers open forested habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees. Feeds primarily on moths.	Unlikely. The Study Area does not contain riparian habitat with large trees to support roosting for this species. This species may be observed foraging within the Study Area, but it is unlikely to roost there.
big free-tailed bat <i>Nyctinomops macrotis</i>	SSC, WBWG	Occurs rarely in low-lying arid areas. Requires high cliffs or rocky outcrops for roosting sites.	Unlikely. No cliffs or other suitable roost habitat are present within the Study Area or vicinity. The Study Area is outside this species known range, and although there is a documented occurrence within 3.8 miles of the Study Area, this occurrence is considered vagrant.
American badger <i>Taxidea taxus</i>	SSC	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils. Requires friable soils and open, uncultivated ground. Preys on burrowing rodents.	Unlikely. The Study Area is an industrial work area with frequent disturbance and no connectivity to known occupied or suitable open grassland habitats. The nearest documented occurrence is 12 miles southwest of the Study Area (CDFW 2017)
ringtail <i>Bassariscus astutus</i>	CFP	Widely distributed throughout most of California, absent from some portions of the Central Valley and northeastern California. Found in a variety of habitats including riparian areas, semi-arid country, deserts, chaparral, oak woodlands, pinyon pine woodlands, juniper woodlands and montane conifer forests usually under 4,600 ft. in elevation. Typically uses cliffs or large trees for shelter.	No Potential. The Study Area does not contain suitable woodland or chaparral habitat adjacent to freshwaters to support foraging or denning for this species.
San Francisco dusky-footed woodrat <i>Neotoma fuscipes annectens</i>	SSC	Forest habitats of moderate canopy and moderate to dense understory. Also in chaparral habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	No Potential. The Study Area does not contain riparian or chaparral habitat to provide cover or material for nesting. The nearest documented occurrence is over seven miles south of the Study Area (CDFW 2017).

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Joaquin kit fox <i>Vulpes macrotis mutica</i>	FE, ST	Annual grasslands or grassy open stages with scattered shrubby vegetation. Need loose-textured sandy soils for burrowing, and suitable prey base.	No Potential. The Study Area is east of the species' known range and does not contain connectivity to suitable open grassland habitat. The nearest documented occurrence is over 10 miles southeast of the Study Area (CDFW 2017).
salt marsh harvest mouse <i>Reithrodontomys raviventris</i>	FE, SE, CFP	Endemic to emergent salt and brackish wetlands of the San Francisco Bay Estuary. Pickleweed marshes are primary habitat; also occurs in various other wetland communities with dense vegetation. Does not burrow, builds loosely organized nests. Requires higher areas for flood escape.	Moderate Potential. The Study Area contains marsh communities suitable for this species. Additionally, upland communities adjacent to wetlands present within the Study Area may be used opportunistically for foraging by this species. The nearest documented occurrences are adjacent to the Study Area in Point Edith Marsh and across Pacheco Creek west of the Study Area (CDFW 2017).
Suisun shrew <i>Sorex ornatus sinuosus</i>	SSC	Tidal marshes of the northern shores of San Pablo and Suisun Bays. Require dense low-lying cover and drift weed and other litter above the mean high tide line for nesting and foraging.	Unlikely. Although the Study Area is immediately adjacent to Suisun Bay, it is located along the southern shores and therefore within the range of and does not provide habitat connectivity to support this subspecies. The nearest documented occurrence is over five miles north of Study Area, across Suisun Bay (CDFW 2017).
Birds			
golden eagle <i>Aquila chrysaetos</i>	CFP, BCC, EPA	Occurs year-round in rolling foothills, mountain areas, sage-juniper flats, and deserts. Cliff-walled canyons provide nesting habitat in most parts of range; also nests in large trees, usually within otherwise open areas.	Unlikely. The Study Area does not contain canyons of cliffs or large trees to support nesting of this species. The nearest documented nesting occurrence is 6 miles north of the Study Area (CDFW 2017). This species may occasionally forage within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
bald eagle <i>Haliaeetus leucocephalus</i>	FD, SE, CFP, BCC, EPA	Occurs year-round in California, but primarily a winter visitor. Nests in large trees in the vicinity of larger lakes, reservoirs and rivers. Wintering habitat somewhat more variable but usually features large concentrations of waterfowl or fish.	Unlikely. The Study Area does not contain large trees to support nesting of this species. The nearest documented nesting occurrence is over 11 miles west of the Study Area (CDFW 2017). This species may occasionally forage within the Study Area.
northern harrier <i>Circus cyaneus</i>	SSC	Year-round resident and winter visitor. Found in open habitats including grasslands, prairies, marshes and agricultural areas. Nests on the ground in dense vegetation, typically near water or otherwise moist areas. Preys on small vertebrates.	Moderate Potential. The Study Area provides some open foraging habitat for this species, and portions of the Study Area containing low wetland vegetation are suitable for nesting.
white-tailed kite <i>Elanus leucurus</i>	CFP	Year-round resident in coastal and valley lowlands with scattered trees and large shrubs, including grasslands, marshes and agricultural areas. Nests in trees, of which the type and setting are highly variable. Preys on small mammals and other vertebrates.	Moderate Potential. The Study Area contains open grassland habitat to provide foraging, and there are suitably large trees and shrubs to support nesting along Lower Walnut Creek.
American peregrine falcon <i>Falco peregrinus anatum</i>	FD, SD, CFP, BCC	Year-round resident and winter visitor. Occurs in a wide variety of habitats, though often associated with coasts, bays, marshes and other bodies of water. Nests on protected cliffs and also on man-made structures including buildings and bridges. Preys on birds, especially water birds. Forages widely.	Unlikely. The Study Area does not contain suitable elevated nesting structures such as cliffs or tall buildings. This species may occasionally pass through the Study Area but it is unlikely to nest there.
prairie falcon <i>Falco mexicanus</i>	BCC	Year-round resident and winter visitor. Inhabits dry, open terrains, including foothills and valleys. Breeding sites located on steep cliffs. Forages widely.	Unlikely. The Study Area does not contain steep cliffs or open valleys to support breeding by this species.
ferruginous hawk <i>Buteo regalis</i>	BCC	Winter visitor to open habitats, including grasslands, sagebrush flats, scrub, and low foothills surrounding valleys. Preys on mammals. Does not breed in California.	Unlikely. The species does not breed in the region, but may be observed foraging within the Study Area during the non-breeding season.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Swainson's hawk <i>Buteo swainsoni</i>	ST, BCC	Summer resident in California's Central Valley and limited portions of the southern California interior. Nests in tree groves and isolated trees in riparian and agricultural areas, including near buildings. Forages in grasslands and scrub habitats as well as agricultural fields, especially alfalfa. Preys on arthropods year-round as well as smaller vertebrates during the breeding season.	Unlikely. Although the Study Area contains open grasslands typical to support foraging, the Study Area does not contain large trees suitable for nesting. The nearest documented occurrence is over 10 miles east of the Study Area (CDFW 2017).
burrowing owl <i>Athene cunicularia</i>	SSC, BCC	Year-round resident and winter visitor. Occurs in open, dry grasslands and scrub habitats with low-growing vegetation, perches and abundant mammal burrows. Preys upon insects and small vertebrates. Nests and roosts in old mammal burrows, most commonly those of ground squirrels.	Moderate. Much of the Study Area contains bare ground or short vegetation, and there are some burrows in these areas suitable for occupation by this species. The nearest documented occurrence is 1.2 miles south of the Study Area (CDFW 2017).
short-eared owl <i>Asio flammeus</i>	SSC	Occurs year-round, but primarily as a winter visitor; breeding very restricted in most of California. Found in open, treeless areas (e.g., marshes, grasslands) with elevated sites for foraging perches and dense herbaceous vegetation for roosting and nesting. Preys mostly on small mammals, particularly voles.	Unlikely. This species is a rare nester in the region, and disturbance regimens within the Study Area reduce the potential for nesting by this species. The nearest documented nesting occurrence is 10 miles east of the Study Area (CDFW 2017).
long-eared owl <i>Asio otus</i>	SSC	Occurs year-round in California. Nests in trees in a variety of woodland habitats, including oak and riparian, as well as tree groves. Requires adjacent open land with rodents for foraging, and the presence of old nests of larger birds (hawks, crows, magpies) for breeding.	Unlikely. This species is rare in the region and has not been documented in the vicinity (Glover 2009, CDFW 2017). In addition, the Study Area does not contain riparian or woodland communities to support nesting.
Northern spotted owl <i>Strix occidentalis caurina</i>	FT, ST	Year-round resident in dense, structurally complex coniferous and mixed (coniferous-hardwood) forests, usually those with old-growth conifers. Nests on platform-like substrates in the forest canopy, including in tree cavities. Preys on mammals.	No Potential. The Study Area does not contain suitable coniferous or mixed forest habitat that this species requires.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
black oystercatcher <i>Haematopus bachmani</i>	BCC	Year-round resident of rocky coast habitats along the Pacific coast. Also occurs on coastal and lower estuarine mud-flats. Forages primarily on intertidal invertebrates.	No Potential. The Study Area does not contain mud-flats or coastal habitat. Suitable foraging habitat may be present along the shores of the Suisun Bay, 300 feet north of the Study Area.
California black rail <i>Laterallus jamaicensis coturniculus</i>	ST, CFP	Year-round resident in marshes (saline to freshwater) with dense vegetation within four inches of the ground. Prefers larger, undisturbed marshes that have an extensive upper zone and are close to a major water source. Extremely secretive and cryptic.	Unlikely. The Study Area lacks tidal influence and provides only marginal habitat. Potential suitable habitat with no documented occurrences is present west of Study Area along the west bank of Lower Walnut Creek. Pickleweed is present within the Study Area, but not large expanses suitable to support black rail or foraging habitat (tidal sloughs or other areas with dense veg). In addition, WRA has surveyed the Study Area for nine consecutive years (2008-2016) and has not detected black rails nesting within the Study Area. One black rail was detected in the west bank of Lower Walnut Creek during a survey in 2009.
California Ridgway's (clapper) rail <i>Rallus obsoletus obsoletus</i>	FE, SE, CFP	Year-round resident in tidal marshes of the San Francisco Bay estuary. Requires tidal sloughs and intertidal mud flats for foraging, and dense marsh vegetation for nesting and cover. Typical habitat features abundant growth of cordgrass and pickleweed. Feeds primarily on mollusks and crustaceans.	Unlikely. No suitable habitat (tidal salt marsh or mudflats) is present in the Study Area. Potential suitable habitat with no documented occurrences is present west of Study Area along the west bank of Lower Walnut Creek. No CRRs have been detected within 700 feet of WMU 32 Study Area during nine consecutive years (2008-2016) of rail surveys at WMU 32.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
California least tern <i>Sternula antillarum browni</i>	FE, SE, CFP	Summer resident along the coast from San Francisco Bay south to northern Baja California; inland breeding also very rarely occurs. Nests colonially on barren or sparsely vegetated areas with sandy or gravelly substrates near water, including beaches, islands, and gravel bars. In San Francisco Bay, has also nested on salt pond margins.	Unlikely. The Study Area does not contain sheltered gravel nesting or foraging habitat for this species. This species may be observed foraging within the vicinity of the Study Area, along Suisun Bay.
western snowy plover <i>Charadrius nivosus</i> <i>(alexandrines) nivosus</i>	FT, SSC, BCC	Federal listing applies only to the Pacific coastal population. Year-round resident and winter visitor. Occurs on sandy beaches, salt pond levees, and the shores of large alkali lakes. Nests on the ground, requiring sandy, gravelly or friable soils.	Unlikely. The Study Area does not contain beach, or shore habitat to support nesting or foraging of this species. The nearest suitable habitat is over 10 miles west towards the San Pablo Bay.
great blue heron <i>Ardea herodias</i>	none (breeding sites protected by CDFW)	Year-round resident. Nests colonially or semi-colonially in tall trees and on cliffs, also sequestered terrestrial substrates. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	Unlikely. The Study Area does not contain trees suitable to support a nesting colony. Additionally there are no documented rookeries within the Study Area or immediately adjacent area (CDFW 2017). This species may be observed foraging within the Study Area.
great egret <i>Ardea alba</i>	none (breeding sites protected by CDFW)	Year-round resident. Nests colonially or semi-colonially, usually in trees, occasionally on the ground or elevated platforms. Breeding sites usually in close proximity to foraging areas: marshes, lake margins, tidal flats, and rivers. Forages primarily on fishes and other aquatic prey, also smaller terrestrial vertebrates.	Unlikely. The Study Area does not contain trees suitable to support a nesting colony. Additionally there are no documented rookeries within the Study Area or immediately adjacent area (CDFW 2017). This species may be observed foraging within the Study Area.
Allen's hummingbird <i>Selasphorus sasin</i>	BCC	Summer resident along the California coast, breeding in a variety of woodland and forest habitats, including parks and gardens with abundant nectar sources. Nest in shrubs and trees with dense vegetation.	Unlikely. The Study Area does not provide suitable woodland or forest vegetation to support nesting or foraging for this species.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Western yellow-billed cuckoo <i>Coccyzus americanus occidentalis</i>	FT, SE, BCC	Summer resident, breeding in dense riparian forests and jungles, typically with early successional vegetation present. Utilizes densely-foliaged deciduous trees and shrubs. Eats mostly caterpillars. Current breeding distribution within California very restricted.	No potential. The Study Area does not contain suitable riparian forest habitat required for nesting or foraging by this species.
olive-sided flycatcher <i>Contopus cooperi</i>	SSC, BCC	Summer resident. Typical breeding habitat is montane coniferous forests. At lower elevations, also occurs in wooded canyons and mixed forests and woodlands. Often associated with forest edges. Arboreal nest sites located well off the ground.	Unlikely. This species is uncommon in the Delta and is more commonly found in the region in higher elevation portions of the coast ranges. Additionally, the Study Area does not contain forested communities to support nesting of this species.
bank swallow <i>Riparia riparia</i>	ST	Summer resident in riparian and other lowland habitats near rivers, lakes and the ocean in northern California. Nests colonially in excavated burrows on vertical cliffs and bank cuts (natural and manmade) with fine-textured soils. Historical nesting range in southern and central areas of California has been eliminated by habitat loss. Currently known to breed in Siskiyou, Shasta, and Lassen Cos., portions of the north coast, and along Sacramento River from Shasta Co. south to Yolo Co.	No Potential. The Study Area and vicinity do not contain suitable riparian bank habitat for this species. The Study Area is outside the current known breeding range.
Nuttall's woodpecker <i>Picoides nuttallii</i>	BCC	Year-round resident in lowland woodlands throughout much of California west of the Sierra Nevada. Typical habitat is dominated by oaks; also occurs in riparian woodland. Nests in tree cavities.	Unlikely. The Study Area and immediately adjacent do not contain woodland trees with cavities suitable to support nesting or foraging of this species.
Lewis's woodpecker <i>Melanerpes lewis</i>	BCC	Uncommon resident in California occurring on open oak savannahs, broken deciduous and coniferous habitats. Breeds primarily in ponderosa pine forests, riparian woodlands and disturbed pine forests but is also known to nest in orchards and oak woodlands. Rare nester in the San Francisco Bay Area.	Unlikely. The Study Area and immediately adjacent do not contain trees suitable to support nesting or foraging of this species. This species predominately winters in the San Francisco Bay Area.

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(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
loggerhead shrike <i>Lanius ludovicianus</i>	BCC, SSC	Year-round resident in open woodland, grassland, savannah and scrub. Prefers areas with sparse shrubs, trees, posts, and other suitable perches for foraging. Preys upon large insects and small vertebrates. Nests are well-concealed in densely-foliaged shrubs or trees.	Unlikely. Although grassland foraging habitat is present within the Study Area, there are few shrubs or dense trees to support nesting.
oak titmouse <i>Baeolophus inornatus</i>	BCC	Occurs year-round in woodland and savannah habitats where oaks are present, as well as riparian areas. Nests in tree cavities.	Unlikely. The Study Area and immediately adjacent do not contain woodland trees with cavities suitable to support nesting or foraging of this species.
yellow warbler <i>Setophaga (Dendroica) petechia brewsteri</i>	SSC, BCC	Summer resident throughout much of California. Breeds in riparian vegetation close to water, including streams and wet meadows. Microhabitat used for nesting variable, but dense willow growth is typical. Occurs widely on migration.	Unlikely. The Study Area and immediately adjacent areas do not contain riparian trees to support foraging or nesting by this species.
black-chinned sparrow <i>Spizella atrogularis</i>	BCC	Summer resident. Typically occurs on arid, rocky slopes with brushy vegetation, e.g. mixed chaparral and sagebrush.	Unlikely. The Study Area and immediately adjacent areas do not contain chaparral or scrub habitat to support nesting or foraging of this species.
grasshopper sparrow <i>Ammodramus savannarum</i>	SSC	Summer resident. Breeds in open grasslands in lowlands and foothills, generally with low- to moderate-height grasses and scattered shrubs. Well-hidden nests are placed on the ground.	Unlikely. The Study Area and immediately adjacent areas do not contain undisturbed grassland habitat to support nesting or foraging of this species. This species is predominately found in the Coast Range hills in the region.
Samuels (San Pablo) song sparrow <i>Melospiza melodia samuelis</i>	BCC, SSC	Year-round resident of tidal marshes along the north side of San Francisco and San Pablo Bays. Typical habitat is dominated by pickleweed, with gumplant and other shrubs present in the upper zone for nesting. May forage in areas adjacent to marshes.	No Potential. The Study Area is outside of the subspecies' known range.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Suisun song sparrow <i>Melospiza melodia maxillaris</i>	BCC, SSC	Year-round resident of brackish-water marshes along Suisun Bay. Inhabits cattails, tules, bulrushes and other emergent vegetation, including pickleweed. Nests typically placed in shrubs.	High Potential. Wetland emergent vegetation to support nesting and foraging of this species is present within the Study Area. This species is known from the vicinity and presumably present in wetland areas adjacent to the Study Area.
Lawrence's goldfinch <i>Spinus lawrencei</i>	BCC	Summer resident, primarily in southern California; generally uncommon and local. Typically found in arid open woodlands, including oak savannah. Breeding distribution is erratic from year to year.	Unlikely. This species typically inhabits open woodlands and oak savannah. Vegetation to support nesting and foraging of this species is not present within the Study Area.
tricolored blackbird <i>Agelaius tricolor</i>	SSC, BCC	Nearly endemic to California, where it is most numerous in the Central Valley and vicinity. Highly colonial, nesting in dense aggregations over or near freshwater in emergent growth or riparian thickets. Also uses flooded agricultural fields. Abundant insect prey near breeding areas essential.	Unlikely. The Study Area contains areas of inundation but no tall and dense areas of vegetation that may support nesting of this species. This species has been documented within 2 miles west of the Study Area.
saltmarsh common yellowthroat <i>Geothlypis trichas sinuosa</i>	BCC, SSC	Resident of the San Francisco Bay region, in fresh and salt water marshes. Requires thick, continuous cover down to water surface for foraging; tall grasses, tule patches, willows for nesting.	Moderate Potential. The Study Area contains areas of inundation and associated marsh vegetation that may support nesting of this species. This species is known from the vicinity and is presumably present in wetland areas adjacent to the Study Area.
yellow-billed magpie <i>Pica nuttalli</i>	BCC	Endemic to the Central Valley and central Coast Ranges. Favors open park-like areas with expanses of open ground, including oak savannah, orchards, and along stream courses. Large, dome-shaped stick nests are placed in trees.	Unlikely. The Study Area does not contain woodland communities suitable for nesting. This species may be occasionally observed foraging within the Study Area.
Reptiles and Amphibians			

Appendix B- Potential for Special Status Species to Occur in the Study Area
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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Alameda whipsnake <i>Masticophis lateralis euryxanthus</i>	FT, ST	Inhabits chaparral and foothill-hardwood habitats in the eastern Bay Area. Prefers south-facing slopes and ravines with rock outcroppings where shrubs form a vegetative mosaic with oak trees and grasses and small mammal burrows provide basking and refuge.	No Potential. The Study Area is outside of the species' known range and does not contain suitable scrub or woodland habitat.
giant garter snake <i>Thamnophis gigas</i>	FT, ST	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California.	No Potential. The Study Area is west of this species' known range and does not contain suitable freshwater habitat.
Foothill yellow-legged frog <i>Rana boylei</i>	SE, SSC	Found in or adjacent to rocky streams in a variety of habitats. Prefers partly-shaded, shallow streams and riffles with a rocky substrate; requires at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis. Feeds on both aquatic and terrestrial invertebrates.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented occurrence is five miles southwest of the Study Area (CDFW 2021).
California red-legged frog <i>Rana draytonii</i>	FT, SSC	Lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11 to 20 weeks of permanent water for larval development. Associated with quiet perennial to intermittent ponds, stream pools and wetlands. Prefers shorelines with extensive vegetation. Disperses through upland habitats after rains.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented occurrence is four miles west of the Study Area (CDFW 2017).
California tiger salamander <i>Ambystoma californiense</i>	FE/FT, ST	Populations in Santa Barbara and Sonoma counties currently listed as endangered; threatened in remainder of range. Inhabits grassland, oak woodland, ruderal and seasonal pool habitats. Adults are fossorial and utilize mammal burrows and other subterranean refugia. Breeding occurs primarily in vernal pools and other seasonal water features.	No Potential. No suitable freshwater habitat is present in the Study Area or vicinity. The nearest documented extant occurrence is four miles east of the Study Area (CDFW 2017)

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Blainville's (Coast) horned lizard <i>Phrynosoma blainvillii (coronatum)</i>	SSC	Frequents a wide variety of habitats, most common in lowlands along sandy washes with scattered low bushes. Prefers friable, rocky, or shallow sandy soils for burial; open areas for sunning; bushes for cover; and an abundant supply of ants and other insects.	Unlikely. The Study Area is presumably former bayland/wetland and existing conditions are marginal with a low potential for colonization, as urban development impedes colonization from existing populations.
silvery legless lizard <i>Anniella pulchra pulchra</i>	SSC	Fossorial species, inhabiting sandy or loose loamy soils under relatively sparse vegetation. Suitable habitat includes dunes, stream terraces, and scrub and chaparral. Adequate soil moisture is essential.	Unlikely. The Study Area is presumably former bayland/wetland and existing conditions are marginal with a low potential for colonization, as urban development impedes colonization from existing populations.
Pacific (western) pond turtle <i>Actinemys marmorata</i>	SSC	Thoroughly aquatic, inhabiting ponds, marshes, streams, and irrigation ditches with aquatic vegetation. Requires basking sites such as partially submerged logs, vegetation mats, or open mud banks, and suitable upland habitat (sandy banks or grassy open fields) for egg-laying.	Moderate. The Study Area contains aquatic features to support this species, with adjacent brackish tidal sloughs. The nearest documented occurrence is 0.5 miles west of the Study Area (CDFW 2017).
Fishes			
Pacific lamprey <i>Entosphenus (=Lampetra) tridentatus</i>	SSC	Spawns between March and July in gravel bottomed streams in riffle habitat. Larvae drift downstream to areas of low velocity and fine substrates and are relatively immobile in the stream substrates.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
river lamprey <i>Lampetra ayresi</i>	SSC	Lower Sacramento River, San Joaquin River and Russian River. May occur in coastal streams north of San Francisco Bay. Adults need clean, gravelly riffles, Ammocoetes need sandy backwaters or stream edges, good water quality and temps < 25 degrees C	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
green sturgeon <i>Acipenser medirostris</i>	FT, SSC	Anadromous. Spawns in the Sacramento and Klamath River systems. Lingering transients may be found throughout the San Francisco Bay Estuary, particularly juveniles.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
white sturgeon <i>Acipenser transmontanus</i>	SSC	Found in most estuaries along the Pacific coast. Adults in the San Francisco Bay Estuary system spawn in the Sacramento River and are not known to enter freshwater or non-tidal reaches of Estuary streams. Spawn May through June.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as rearing, and foraging habitat as well as providing a migratory corridor for this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon - Central Valley spring-run ESU <i>Oncorhynchus tshawytscha</i>	FT,ST, NMFS	Occurs in the Feather River and the Sacramento River and its tributaries, including Butte, Mill, Deer, Antelope and Beegum Creeks. Adults enter the Sacramento River from late March through September. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams from mid-August through early October. Juveniles migrate soon after emergence as young-of-the-year, or remain in freshwater and migrate as yearlings.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon – Sacramento winter-run ESU <i>Oncorhynchus tshawytscha</i>	FE, SE, NMFS	Occurs in the Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams. Requires clean, cold water over gravel beds with water temperatures between 6 and 14 degrees C for spawning. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles typically migrate to the ocean soon after emergence from the	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Chinook salmon - central valley fall/late fall-run ESU <i>Oncorhynchus tshawytscha</i>	SSC, NMFS	Populations spawning in the Sacramento and San Joaquin Rivers and their tributaries. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. The Delta is used as a rearing and migratory corridor by this species. Spawning habitat for this species is not present within the Study Area.
Chinook salmon - California coastal ESU <i>Oncorhynchus tshawytscha</i>	FT	California Coastal Chinook Salmon ESU includes all naturally spawned populations of Chinook salmon from rivers and streams south of the Klamath River (exclusive) to the Russian River (inclusive). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel. Water temps >27 degrees C lethal to adults.	No Potential. The Study Area does not occur within this ESU's range.
Coho salmon - central CA coast ESU <i>Oncorhynchus kisutch</i>	FE, SE	Federal listing includes populations between Punta Gorda and San Lorenzo River. State listing includes populations south of San Francisco Bay only. Occurs inland and in coastal marine waters. Requires beds of loose, silt-free, coarse gravel for spawning. Also needs cover, cool water and sufficient dissolved oxygen.	No Potential. This species is extirpated from San Francisco Bay and its tributaries (NMFS 2012).
steelhead - central valley DPS <i>Oncorhynchus mykiss irideus</i>	FT, NMFS	Includes all naturally spawned populations (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries, excluding San Francisco and San Pablo bays and their tributaries. Preferred spawning habitat is in cool to cold perennial streams with high dissolved oxygen levels and fast flowing water. Abundant riffle areas for spawning and deeper pools with sufficient riparian cover for rearing are necessary for successful breeding.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta. Near the southern end of the Study Area, Pacheco Creek meets Walnut Creek, which currently supports a population of this species (Leidy et al 2005). Therefore, this species must migrate past the Study Area and may rear within tidally influenced portions of the Delta and creek before migrating to the open ocean. No suitable freshwater spawning habitat is present.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
steelhead - central CA coast DPS <i>Oncorhynchus mykiss irideus</i>	FT	Occurs from the Russian River south to Soquel Creek and Pajaro River. Also in San Francisco and San Pablo Bay Basins. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for one or more years before migrating downstream to the ocean.	No Potential. The Study Area does not occur within this DPS's range.
steelhead - south/central CA coast DPS <i>Oncorhynchus mykiss irideus</i>	FT	Occurs in coastal basins from the Pajaro River south to, but not including, the Santa Maria River. Adults migrate upstream to spawn in cool, clear, well-oxygenated streams. Juveniles remain in fresh water for 1 or more years before migrating downstream to the ocean.	No Potential. The Study Area does not occur within this DPS's range.
Delta smelt <i>Hypomesus transpacificus</i>	FT, SE	Lives in the Sacramento-San Joaquin estuary in areas where salt and freshwater systems meet. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Seldom found at salinities > 10 ppt; most often at salinities < 2 ppt.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
longfin smelt <i>Spirinchus thaleichthys</i>	FC, ST, SSC	Euryhaline, nektonic and anadromous. Found in open waters of estuaries, mostly in middle or bottom of water column. Prefer salinities of 15 to 30 ppt, but can be found in completely freshwater to almost pure seawater.	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species for migration as well as rearing and foraging.
Sacramento perch <i>Archoplites interruptus</i>	SSC	Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley. Prefer warm water. Aquatic vegetation is essential for young. Tolerate wide range of physio-chemical water conditions.	No Potential. This species is considered extirpated throughout its native range and now only exists in isolated waterbodies (i.e. lakes or ponds) where it has been introduced (Crain and Moyle 2011).

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	SSC	Formerly endemic to the lakes and rivers of the Central Valley, but now confined to the Sacramento Delta, Suisun Bay and associated marshes. Occurs in slow-moving river sections and dead-end sloughs. Requires flooded vegetation for spawning and foraging for young. A freshwater species, but tolerant of moderate salinity (10-18 parts per thousand).	No Potential. The Study Area lies adjacent to Pacheco Creek and the San Francisco Bay Delta, which is known to support this species. However, there is no suitable aquatic habitat in the Study Area.
Invertebrates			
vernal pool andrenid bee <i>Andrena blennospermatis</i>	SSI	A solitary, ground-nesting bee found in upland areas near vernal pools. Its host plant is <i>Blennosperma</i> spp. and does not forage far from the host plant. Range is Contra Costa, El Dorado, Lake, Placer, Sacramento, San Joaquin, Solano, Sonoma, Tehama, and Yolo counties.	No Potential. The Study Area does not contain vernal pool habitat to support this species
Antioch andrenid bee <i>Perdita scitula antiochensis</i>	SSI	Occurs within the Antioch dunes. Visits flowers of <i>Eriogonum</i> spp., <i>Gutierrezia californica</i> , <i>Heterotheca grandiflora</i> , and <i>Lessingia glandulifera</i> .	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat or associated flowering plants.
Antioch Dunes halictid bee <i>Sphecodogastra antiochensis</i>	SSI	A rare, specialist foraging bee with a very restricted distribution—the Antioch Dunes of Contra Costa County, California.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
Antioch sphecid wasp <i>Philanthus nasalis</i>	SSI	Known only from the Antioch dunes of the Sacramento-San Joaquin Delta area, in the vicinity of Antioch, Contra Costa County. Also collected in Santa Cruz County.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
Antioch efferian robberfly <i>Efferia antiochi</i>	SSI	Known only from Antioch, Fresno, and Scout Island in the San Joaquin River.	No Potential. The Study Area is outside the known range of this species and does not contain dune habitat.
California linderiella <i>Linderiella occidentalis</i>	SSI	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Water in the pools has very low alkalinity, conductivity, and TDS.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is 0.6 mile west of the Study Area across Pacheco Creek (CDFW 2017).

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(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
conservancy fairy shrimp <i>Branchinecta conservatio</i>	FE, SSI	Endemic to the grasslands of the northern two-thirds of the Central Valley; found in large, turbid pools. Inhabit astatic pools located in swales formed by old, braided alluvium; filled by winter/spring rains, last until June.	No Potential. The Study Area does not contain vernal pool habitat to support this species and is west of this species' known range. The nearest documented occurrence is over 10 miles northeast of the Study Area (CDFW 2017).
vernal pool fairy shrimp <i>Branchinecta lynchi</i>	FT, SSI	Endemic to the grasslands of the Central Valley, central coast mountains, and south coast mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swale, earth slump, or basalt-flow depression pools.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is over 10 miles east of the Study Area (CDFW 2017).
Longhorn fairy shrimp <i>Branchinecta longiantenna</i>	FE	Endemic to the eastern margin of the central coast mountains in seasonally astatic grassland vernal pools. Inhabit small, clear-water depressions in sandstone and clear-to-turbid clay/grass-bottomed pools in shallow swales.	No Potential. The Study Area does not contain vernal pool habitat to support this species.
vernal pool tadpole shrimp <i>Lepidurus packardii</i>	FE, SSI	Inhabits vernal pools and swales in the Sacramento Valley containing clear to highly turbid water. Pools commonly found in grass bottomed swales of unplowed grasslands. Some pools are mud-bottomed and highly turbid.	No Potential. The Study Area does not contain vernal pool habitat to support this species. The nearest documented occurrence is over 15 miles northeast of the Study Area (CDFW 2017).
San Bruno elfin butterfly <i>Callophrys mossii bayensis</i>	FE, SSI	Limited to the vicinity of San Bruno Mountain, San Mateo County. Colonies are located on in rocky outcrops and cliffs in coastal scrub habitat on steep, north-facing slopes within the fog belt. Species range is tied to the distribution of the larval host plant, <i>Sedum spathulifolium</i> .	No Potential. The Study Area is outside this species' very limited extant range and does not contain rocky outcrops or coastal scrub to support the host plant.
monarch butterfly <i>Danaus plexippus</i>	Winter roost sites protected by CDFW	Winter roost sites extend along the coast from northern Mendocino to Baja California, Mexico. Roosts located in wind-protected tree groves (eucalyptus, Monterey pine, Monterey cypress), with nectar and water sources nearby.	Unlikely. The Study Area does not contain groups of trees that would provide shelter from winds and extreme temperatures to support roosting. This species may forage within the Study Area.

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SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Callippe silverspot butterfly <i>Speyeria callippe callippe</i>	FE, SSI	Two populations in San Bruno mountain and the Cordelia Hills are recognized. Hostplant is <i>Viola pedunculata</i> , which is found on serpentine soils. Most adults found on east-facing slopes; males congregate on hilltops in search of females.	No Potential. The Study Area does not contain serpentine soils to support this species' host plant, <i>Viola pedunculata</i> .
Lange's metalmark butterfly <i>Apodemia mormo langei</i>	FE, SSI	Inhabits stabilized dunes along the San Joaquin River. Endemic to Antioch Dunes, Contra Costa County. Primary host plant is <i>Eriogonum nudum</i> var. <i>auriculatum</i> ; feeds on nectar of other wildflowers, as well as host plant.	No Potential. The Study Area does not contain this species' host plant, <i>Eriogonum nudum</i> var. <i>auriculatum</i> .
Antioch Dunes anthicid beetle <i>Anthicus antiochensis</i>	SSI	<i>Anthicus antiochensis</i> is apparently extirpated from the type locality at Antioch Dunes (CDFW 2015). Stabilization of the dunes in the 1950s may have eliminated suitable habitat. It is also known at several sites along the Sacramento River in Glenn, Tehama, Shasta, and Solano Counties, and from one site at Nicolas on the Feather River in Sutter County.	No Potential. The Study Area is outside this species' locally restricted range in the Antioch Dunes, where it is considered extirpated.
Delta green ground beetle <i>Elaphrus viridis</i>	FT, SSI	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis Air Force Base. Prefers the sandy mud substrate where it slopes gently into the water, with low-growing vegetation, 25 to 100% cover.	No Potential. The Study Area does not contain vernal pool habitat to support this species, and it is outside of this species' known range. The nearest documented occurrence is 17 miles northeast of the Study Area (CDFW 2017).
molestan blister beetle <i>Lytta molesta</i>	SSI	Inhabits the Central Valley of California, from Contra Costa to Kern and Tulare counties. <i>Lytta molesta</i> has been collected on <i>Lupinus</i> spp., <i>Trifolium wormskioldii</i> in dried vernal pools, and on <i>Eriodium</i> spp. Appears to be absent in nearby areas with non-vernal pool vegetation, but a lack of detailed collecting information makes it unclear whether the species is always or usually associated with dried vernal pools.	No Potential. The Study Area is outside the known range of this species and does not contain vernal pool habitat.

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
San Joaquin dune beetle <i>Coelus gracilis</i>	SSI	Inhabits fossil dunes along the western edge of San Joaquin Valley; extirpated from Antioch Dunes (type locality). Inhabits sites containing sandy substrates.	Unlikely. The Study Area is outside this species' range.
valley elderberry longhorn beetle <i>Desmocerus californicus dimorphus</i>	FT, SSI	Occurs only in the central valley of California, in association with blue elderberry (<i>Sambucus</i> spp.). Prefers to lay eggs in elderberry 2 to 8 inches in diameter; some preference shown for "stressed" elderberry.	No Potential. The Study Area does not contain blue elderberry to support this species, and is outside of this species' known range. The nearest documented occurrence is over 10 miles north of the Study Area (CDFW 2017).
western bumble bee <i>Bombus occidentalis</i>	SCE, SSI	Formerly common throughout much of western North America; populations from southern British Columbia to central California have nearly disappeared (Xerces 2017). Occurs in a wide variety of habitat types. Nests are constructed annually in pre-existing cavities, usually on the ground (e.g. mammal burrows). Many plant species are visited and pollinated.	Unlikely. This species is wide-ranging in California. The Study Area does not contain significant nectar sources and nesting substrates to support this species in any large concentration.

* Key to status codes:

BCC	U. S. Fish and Wildlife Service (USFWS) Birds of Conservation Concern
CFP	CDFW Fully Protected Animal
FE	Federal Endangered
FT	Federal Threatened
SE	State Endangered
SCE	State Candidate Endangered
SSC	California Department of Fish and Wildlife (CDFW) Species of Conservation Concern
SSI	California Department of Fish and Wildlife (CDFW) Special Status Invertebrate
ST	State Threatened
SR	State Rare

Appendix B- Potential for Special Status Species to Occur in the Study Area
(WMU-32)

SPECIES	STATUS*	HABITAT	POTENTIAL FOR OCCURRENCE**
Rank 1B		CNPS Rank 1B: Plants rare, threatened or endangered in California and elsewhere	
Rank 2B		CNPS Rank 2B: Plants rare, threatened, or endangered in California, but more common elsewhere	
Rank 4		CNPS Rank 4: Plants of limited distribution (a watch list)	
WBWG		Western Bat Working Group Priority Species	

****Potential to Occur:**

No Potential. Habitat on and adjacent to the site is clearly unsuitable for the species requirements (cover, substrate, elevation, hydrology, plant community, site history, disturbance regime).

Unlikely. Few of the habitat components meeting the species requirements are present, and/or the majority of habitat on and adjacent to the site is unsuitable or of very poor quality. The species is not likely to be found on the site.

Moderate Potential. Some of the habitat components meeting the species requirements are present, and/or only some of the habitat on or adjacent to the site is unsuitable. The species has a moderate probability of being found on the site.

High Potential. All of the habitat components meeting the species requirements are present and/or most of the habitat on or adjacent to the site is highly suitable. The species has a high probability of being found on the site.

APPENDIX C – REFINERY BREEDING BIRD SURVEY DOCUMENTS

Burrowing Owl at 10/11/14

6 messages

John Dowdakin <John.G.Dowdakin@mwhglobal.com>

Mon, Feb 24, 2014 at 4:45 PM

To: "Bianca Clarke <clarke@wra-ca.com> (clarke@wra-ca.com)" <clarke@wra-ca.com>, Matt Osowski <osowski@wra-ca.com>

Cc: Michael McGuire <MMcGuire@geosyntec.com>

Hi Matt and Bianca,

Rich Brush of ERRG, who was operating the water pumps at 10/11/14 last Friday and today, says he saw a burrowing owl at one of the berms. Don't know if that is of concern to the ART/Refinery. His activities are apparently not disturbing it. He'll be at the Refinery on Wednesday if you need him to show you where it is.

John Dowdakin

MWH Americas, Inc.

2121 N. California Blvd., Suite 600

Walnut Creek, CA 94596

925-627-4628 (office)

925-330-9976 (cell)

Matt Osowski <osowski@wra-ca.com>

Tue, Feb 25, 2014 at 9:46 AM

To: John Dowdakin <John.G.Dowdakin@mwhglobal.com>, Bianca Clarke <clarke@wra-ca.com>

Cc: Michael McGuire <MMcGuire@geosyntec.com>, Gwen Santos <santos@wra-ca.com>

Hi John,

Thanks for passing along the observation. We have seen burrowing owls at the WMU in the past. It would be helpful to come out and see if we can confirm the sighting and determine if it is nesting in the area. If it turns out to be a nesting bird, we can map the location for reference later if there is any proposed work nearby.

I will see if I can get someone out on Wednesday and get back to you. If not, we can talk to Rich and have him describe the location for investigation on Thursday.

Michael, note that my interest in this observation is because we still stand a chance of doing some investigation work out in the unit before the end of the breeding bird season or August 31. ART should understand if any nesting birds will affect the work. If you have any concerns about investigating further, please let me know.

Thanks,
Matt

3rd

20

3/7/14 GER WMLs 10/11/14 roll survey

Me solo; survey #3

Survey 1655/1855

Weather Clear (<5%), wind 2-4 mph, west; wmm.

Notes Active survey. Tide low, flooding.

Station 1 1655-1704 → ∅.

- 5 min. passive listening.
- ~1 min. CLRA kbd & duct.
- 2 min. passive listening.

Station 2 1712-1722

• As previous.

1712-1722

• 1 VIRA kicker, 332°, 75-150 m.

• 1 BLRA kbd, 324°, 75-125 m.

• ∅ CLRA. 2 VIRA grnt (in response?) 3 VIRA kbd.

Station 3 1725-1736

• As previous

• 1 BLRA kbd, 33°, 75-125 m.

• 2 VIRA grnt.

• ∅ CLRA

[Sp] MAWR(s), GRVE, VIRA, GAPW; GRVE, SOSP, RWBL, BNST; PRGR

Station 4 1743-1754

• No CLRA habitat. Methods as previous.

WML

21

• 1 BLRA kbd, 310°, next to tracks as marked on map.

• ∅ CLRA.

• 1 BLRA kbd, 112°, in WML! 2x Patch of saltgrasses surrounded by shallow inundation. Photos.

Break: Looking for BLRA around WMLs. Nothing seen. WML 14 (perim.) + cross beams has burrows, no sign.

Station 1 1816-1826

As previous. → ∅ CLRA.

• VIRA: 4 grnt, 3 kicker!

• BLRA 1 kbd, 340°, 100-125 m.

Station 2 1827-1835

As previous → ∅

• 1 BLRA kbd, 305°, 75-125 m.

• VIRA: 7+ head, ducts/grnts, kicker.

Station 3 1838-1847

As previous. → ∅.

Summary ∅ CLRA. Several BLRA, including 1 in corner of WML 14

Rite in the Rain

WMU 32 – Summary of Breeding Bird Surveys

Date of Survey	Breeding Birds Observed
06/07/2010	Northern Mockingbird, Mourning Dove, Killdeer
06/15/2015	Mourning Dove, Mockingbird
04/07/2016	No birds
04/11/2016	Killdeer nest/egg
04/12/2016	Killdeer nest/egg
05/10/2016	No birds
04/09/2018	No birds
04/19/2018	No birds
05/01/2018	Killdeer nest/egg
05/02/2018	Killdeer nest/egg
05/03/2018	Killdeer nest/egg
05/07/2018	Previously Observed Nest (Not observed)
05/11/2018	No birds

Michael,

Below is a summary of WRA's visit to WMU 32 prior to the start of the soil investigation. Please feel free to contact me with any questions or concerns you may have.

On Monday June 7th WRA biologists Matt Osowski and Bill Stagnaro performed a breeding bird survey and species sensitivity training at WMU 32 prior to the initiation of hand tool soil investigation activities. The biologists arrived on site at approximately 0730 and proceeded to investigate the proposed soil boring locations and the immediate surroundings. They surveyed the project area on foot, walking transects from north to south and south to north, insuring each bore location was investigated. Species observed included: Northern Mockingbird, Red-winged Blackbird, San Francisco Yellowthroat, Marsh Wren, Killdeer, Black Phoebe, Mourning Dove, Cliff Swallow, Red-tailed Hawk, Meadow Lark, Mallard, American Avocet, Common Raven, Western Fence Lizard and California Ground Squirrel. Active nests (nests containing eggs) of the following species were observed: Northern Mockingbird, Mourning Dove and Killdeer. Only the Killdeer was deemed to be in danger of take by construction activities. As a result, one boring location was relocated approximately 25 feet to the south to avoid the nest. In addition, yellow flagging was placed around the nest and the work crew was notified.

Sensitivity training was also performed for the work crew with regards to the potential presence of the Salt Marsh Harvest Mouse. The crew was given Bill Stagnaro's contact information and may contact WRA with questions, or if wildlife impact is discovered or suspected during the soil investigation. The training was conducted for personnel of MWH and Vironex. A sign up sheet is available upon request.

Best regards,

Matt Osowski
Biologist

WRA, Inc

2169 E. Francisco Blvd, Suite G
San Rafael, CA 94901
Office: 415-454-8868 x159
Mobile: 415-531-2474
osowski@wra-ca.com
www.wra-ca.com

Memorandum

To:

From:

Subject: WMU 32 Pre-construction Nesting Bird Survey

Date: June 15, 2015

A pre-construction nesting bird survey was conducted on the morning of June 15, 2015, at the WMU 32 salt-water canal and areas within 100 feet of Project impact areas including staging and access areas. The survey was conducted by WRA wildlife biologist Patricia Valcarcel in the morning hours when birds are most active. A previously identified mourning dove (*Zenaida macroura*) nest was investigated and determined to be currently inactive with a likely successful completion of the nest (fledging of chick). No eggs or chicks were present within the nest structure, and no mourning doves were observed in the vicinity of the nest. One active northern mockingbird (*Mimus polyglottos*) nest was observed approximately 45 feet from Project activities. The nest contained one recently hatched chick and one egg; based on time for northern mockingbird hatchlings to successfully fledge, it is estimated that the nest will be complete in no more than 15 days. The nest is on the side opposite of Project activities; therefore, it is visually screened from activities in the salt-water canal. A 30-foot initial buffer was flagged and contractors made aware of the nest location. It is recommended that no heavy or sustained activities occur within 50 feet of the nest location until it has been determined to be inactive by a qualified biologist. No other active nests were observed. Per common nesting bird survey standards, the results of this survey are valid for 14 days. If Project activities have not been initiated in 14 days (June 30, 2015), a follow-up nesting bird survey is recommended to determine if any nests have been initiated in the interim.

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 4/7/10

Project Phase(s): Fence installation

Monitor(s): Clare Wolf

Time on Site: 0630 To: 1645

Weather Conditions AM: ~55°F, calm, mostly clear

PM: partly cloudy, wind ~10mph, 68°F

Biological Monitoring:

Special status species observed: Yes ___ No If yes, explain in general observation/notes section.

Training

Did all construction personnel receive environmental sensitivity training? Yes No ___

Other species observed:

Species	Species
<u>ORACKLE</u>	<u>CORA</u>
<u>SOSP</u>	<u>CLSW</u>
<u>fence lizard</u>	<u>fox squirrel</u>
<u>BARS</u>	
<u>BREG</u>	
<u>KTL</u>	

SMHM Exclusion Fence Inspection (Fence Section _____):

Fence Repair Needed: Y ___ N ___ If yes, describe actions taken (who was notified, when it was repaired, etc.):

N/A; fence being installed

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG (CON'T)

GENERAL OBSERVATIONS / NOTES:

Biologist on site at 0630. Gave site-specific species training to 6 Overea crew members. Prior to initiation of exclusion fence installation, the biologist walked the project area, and inspected for mice and nesting birds. No mice, or evidence of nesting birds were observed. Using a GPS, the biologist flagged the extent of the mapped SMTM habitat line and wetland delineation lines such that fence ~~is~~ would not be installed in any jurisdictional wetlands or SMTM habitat. Hand-wrenching began at approximately 0900 after permits were given by the fire marshal. During the morning, fence placement relative to mapped jurisdictional areas was discussed with Gwon and Eric, the project engineer. ~~is~~ ~~is~~ ~~is~~ Fence installation began on the northwest section of the project area along WMU 32, and continued until 1030. By the end of the work day, approximately 100 feet of exclusion fencing had been installed.

Biologist monitored fence placement and installation. No vegetation was removed (section of fence is on a dirt levee). No mice or special-status species were observed.


WRA Construction Monitor

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 4/11/16

Project Phase(s): fence installation

Monitor(s): Elise Knecht, Claire Wolf

Time on Site: 7:20 am to: 4:15 pm

Weather Conditions AM: cloudy, ~60°F calm

PM: partly cloudy

Biological Monitoring:

Special status species observed: Yes ___ No If yes, explain in general observation/notes section.

Training

Did all construction personnel receive environmental sensitivity training? Yes No ___
All construction personnel previously trained.

Other species observed:

Species	Species
Killdeer	swallow - various
song sparrow	black phoebe
red-winged blackbird.	
lesser goldfinch	
house finch	
mute swan	

SMHM Exclusion Fence Inspection (Fence Section _____):

Fence Repair Needed: Y ___ N ___ If yes, describe actions taken (who was notified, when it was repaired, etc.):

N/A, fence installation only

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG (CON'T)

GENERAL OBSERVATIONS / NOTES:

Two biologists onsite at 7:20 AM. All crew members previously received environmental sensitivity training. Prior to continuation of exclusion fence installation, biologists walked the project area and inspected for mice and nesting birds. No mice or evidence of nesting birds were observed. Work on previously installed segment of fence began at approximately 7:30, including backfilling ditch at base of exclusionary fencing. Use of ditchwatch began at approximately 8:30 AM in NW region of project area. All vegetation was avoided by ditchwatch. Dave Wolfe left the project site at approximately 9:45 AM and Ellie Knecht remained onsite. Eric Powney + Brad Wendt visited the site around 12-1 pm, and provided input of silt material. Minor adjustment made to placement of silt material.

Killdeer nest with 3 eggs observed south of WMU 32, on the eastern side ~~near~~ on a gravel pad ~~away~~. The location is far from today's work activities (> 200 feet beyond today's work activities). Biologist approached nest from multiple directions and placed flags at distance at boundary of disturbance buffer. Most of the ~~total~~ fence installed on the west boundary of WMU 32 (> 200 feet) was completed today.

Biologist monitored fence placement and installation. No vegetation was removed. Fence alignment is between riparian and edge of veg. No mice or special-status species were observed.



WRA Construction Monitor

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 4/12/14

Project Phase(s): Fence Installation

Monitor(s): Gwen Santos
Time on Site: 7AM To: 4:30 P

Weather Conditions AM: Cloudy 57°F
6 mph winds, south **PM:** Sunny, low clouds 65°F

Biological Monitoring:

Special status species observed: Yes ___ No If yes, explain in general observation/notes section.

Training

Did all construction personnel receive environmental sensitivity training? Yes No ___

Other species observed:

Species	Species
N. Harrier	jack rabbit
red winged black bird	
killdeer	
long tail weasel	
nuthatch	
mourning dove	

SMHM Exclusion Fence Inspection (Fence Section _____):

Fence Repair Needed: Y ___ N ___ If yes, describe actions taken (who was notified, when it was repaired, etc.):

wildlife exclusion fence being installed during shift,

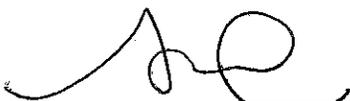
WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG (CON'T)

GENERAL OBSERVATIONS / NOTES:

Biologist on site @ 7:30 AM. All crew members previously received environmental safety training prior to continuation of exclusion fence installation. The biologist walked the project area and inspected for ~~new~~ wildlife. Work began around 8:00 AM when crews continued installation along the west side of WMU 32. Work commenced using hand tools. A ditch witch was utilized along the access road on the east side of the former Salt Water Canal. Crews had to don ~~PPE~~ additional protective PPE to install fence on the south side of WMU 32. The area to the south of the Killdeer nest was cordoned off. The buffer was assessed by the biologist and adjusted, avoiding ~~the~~ ~~the~~ agitation of the Killdeer. Biologist observed her behavior and the distance at which she left the nest. The area was delineated using pencil cones & flagging tape.

No special status species observed.

+/- 300 ft. of fence installed.



WRA Construction Monitor

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 5/10/16

Project Phase(s): Exclusion Fence Installation

Monitor(s): C. Wolff

Time on Site: 0715 To: 1340

Weather Conditions AM: overcast, ~65°F, calm

PM: ~75°F, wind 5-7 mph, mostly clear

Biological Monitoring:

Special status species observed: Yes ___ No If yes, explain in general observation/notes section.

Training

Did all construction personnel receive environmental sensitivity training? Yes No ___

Other species observed:

Species	Species
SOSP	RTTA
NOMO	
HOEI	
BUSH	
Scout Lizard	
RWBL	

SMHM Exclusion Fence Inspection (Fence Section _____):

Fence Repair Needed: Y ___ N If yes, describe actions taken (who was notified, when it was repaired, etc.):

WMU 32 RAT PROJECT CONSTRUCTION MONITORING LOG (CON'T)

GENERAL OBSERVATIONS / NOTES:

Biologist arrived at 0715 and surveyed the work area. No mice, nesting birds, or other special-status species were observed. All crewmembers had previously received environmental sensitivity training; no training given today. Crew finished installing remaining in the northeast corner previously bitten by an active killdeer nest (nest was confirmed to be completed with mobile young last week). Other work consisted of re-digging some fence near the WMU 32 channel, and installing a 6-foot portion of fencing on the south side of the work area between tops of the buildings. No other repairs are needed, and work finished at 1330.

No mice or special-status species were observed.



WRA Construction Monitor

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 4/9/18

Project Phase(s): 15061-3

Monitor(s): S Hill / D. Zwick
 Time on Site: 0700 To: 1530

Weather Conditions AM: sunny 60s PM: sunny 70s

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
Tree frog			
Fence Lizard			
starling			
Jack rabbit			
Red wing black bird			

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 4/19/18

Project Phase(s): 15061-3

Monitor(s): Rmitt

Time on Site: 07:00 To: 16:00

Weather Conditions AM: cloudy 44°F PM: Sunny 58°

Biological Monitoring:

Special status species observed: Yes ___ No X If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
<u>Ground Squirrels</u>			
<u>Crow</u>			
<u>Jack Rabbit</u>			

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 5/1/10

Project Phase(s): 15061-3

Monitor(s): A. Teichmann

Time on Site: ~~0700~~ To: 1630

Weather Conditions AM: 50-70°F PM: → Sunny

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone ___ Email ___

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
WILL	WMU32	N/A	throughout shift
EOST	↓	↓	↓
RWBL			
COLA			
CAGO			
MODD			
MALI			
SOSP			
CLSW			
NOHA			
TUVU			

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG (CON'T)

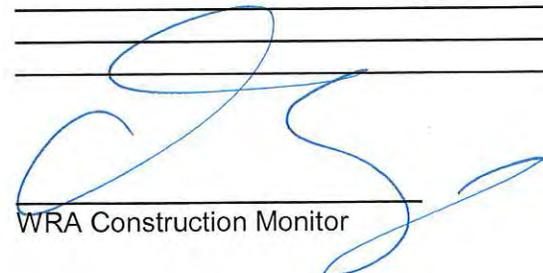
General Construction Area Inspection:

Species observed Y N If yes, describe:

WILL nest/egg located along w/s of fence line. One of the nest/egg. Area - Area to be avoided until egg hatched. Located 50 palm tree stem fence. 50' border w/ pin flags.

GENERAL OBSERVATIONS / NOTES:

Fence line already trenched prior to start of work on 07/30. Fence installation continues and likely to be completed by end of day Wednesday. Following installation includes wire tightening, exit placement, backfilling, and vegetation removal - veg. removal must be coordinated prior to spraying.


WRA Construction Monitor

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 5/2/18

Project Phase(s): 15061-3

Monitor(s): M. Brewer

Time on Site: 0700 To: 1600

Weather Conditions AM: 54°-74°, clear PM: 11

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone ___ Email ___

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
black tailed jactrabbit	WMU 32	N/A	
ground squirrel			
fence lizard			
crow			
CAGO			
FILL			
NOMO	↓	↓	

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG (CON'T)

General Construction Area Inspection:

Species observed Y___ N If yes, describe:

NO special status species observed.

GENERAL OBSERVATIONS / NOTES:

Killdeer nest was monitored in the morning. No adults seen in the vicinity until ~ 11:30. No adults seen near nest. Nest determined to be inactive. Crew worked on installing mouse gates in fence and tying up fence. No special status species observed.


WRA Construction Monitor

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 5/3/18

Project Phase(s): 15061-3

Monitor(s): M. Brewer
 Time on Site: 0700 To: 1600

Weather Conditions AM: Overcast 54° PM: partly cloudy 67°

Biological Monitoring:

Special status species observed: Yes ___ No X If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone ___ Email ___

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
<u>Pacific tree frog</u>	<u>WMU 32</u>	<u>N/A</u>	
<u>RWB</u>	↓	↓	
<u>ground squirrel</u>			
<u>AMCR</u>			
<u>KU</u>			
<u>western fence lizard</u>			



WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 5/7/18

Project Phase(s): 15061-3

Monitor(s): S. Hill

Time on Site: 7:00 To: 9:00

Weather Conditions AM: _____ PM: _____

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone ___ Email ___

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
jack rabbit			

WMU 32 PILOT STUDIES CONSTRUCTION MONITORING LOG

DAILY CONSTRUCTION REPORT

DATE: 5/11/18

Project Phase(s): 15061-3

Monitor(s): D. Zwick

Time on Site: 08:45 To: 16:00

Weather Conditions AM: 56°F Partly Cloudy PM: 76°F Partly Cloud

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following:

Special status species Observed (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes _____

Incidental Take and Report Form filled out/attached: Yes ___ N/A (why) _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
<u>coyote</u>			
<u>N. Harrier</u>			
<u>Grand Squirrel</u>			
<u>A. Crow</u>			
<u>Redtail Hawk</u>			
<u>Canadian Goose</u>			

APPENDIX D - CALIFORNIA RIDGEWAY'S RAIL CONSULTATION



Ms. Jana Affonso
US Fish & Wildlife Service, Bay Delta Office
650 Capitol Mall, 8th Floor, Room 8-300
Sacramento, CA 95814

June 29, 2017

Regarding: Section 7 Consultation (USFWS File Number 08ESMF00-2012-TA-0213-2)

Dear Ms. Affonso:

Thank you for your phone conference of May 31, 2017, and your willingness to take into account, when determining the need for mitigation, the overall condition of the areas potentially impacted by the proposed Avon Remediation Team (ART) clean-up project for Waste Management Units (WMU) located at the Tesoro Martinez Refinery. Specifically, we understand that the US Fish & Wildlife Service (USFWS) concurs that the need for mitigation can be reduced or eliminated if it can be demonstrated that a remediation project, such as the one proposed here, results in long-term benefits to the potentially impacted listed species. As is discussed in detail below, this project is designed to address historic contamination found on the site to enhance water quality as required by the Regional Water Quality Control Board (RWQCB) and the U.S. Environmental Protection Agency (EPA). Conducting this work will benefit the adjacent potential habitat for the California Ridgeway's Rail (CRR, *Rallus obsoletus obsoletus*) by providing a clean buffer, removing hazardous materials that could enter the food chain and impact egg viability, and by contributing to the improvement of the water quality found in Suisun Bay

In considering the need for mitigation it is also important to note that the best scientific evidence available indicates that it is highly unlikely that any CCR will be impacted by the project. As detailed in the letter of May 15, 2017 (Attachment A), it remains the opinion of ART (and its representatives) that the proposed project is unlikely to adversely affect CRR due to the current absence of the species in the adjacent marshlands (see Attachment for survey history and data) and the fact that the WMUs themselves do not represent habitat for CRR. Given the fact that the adjacent marsh in the Point Edith Wildlife Area does include potential habitat for this species, we recognize that it is possible that CRR could occupy the marsh at some point during implementation of the proposed project and if present, CRR could be affected by construction noise. The risk of such an impact, however, is greatly reduced given that the area is already subject to increased noise (meaning that any CRR present would be accustomed to heightened ambient levels) and the fact that the increase would only be temporary.

Given the low likelihood of an adverse impact on CRRs during implementation of the project and the significant environmental benefits that will accrue for the remediation efforts, we are confident that project will result in an overall net benefit to the CRR.

BACKGROUND

The Action Area is located approximately 2 miles east of the Benicia-Martinez Bridge and Interstate 680, at the north end of the Martinez Refinery, in Contra Costa County, California. The Action Area is located on the United States Geological Survey (USGS) Vine Hill 7.5-minute topographical quadrangle (Township 2N, Range 2W, Section 10; 1980) at approximately 38° 2' 2.87" N, 122° 4' 13.36" W, and includes the construction footprint (WMUs 10/11/14, WMU 31, and WMU 32) and their adjacent staging and access areas. The Action Area totals approximately 110 acres, including approximately: 32 acres for WMUs 10/11/14; 8 acres of operational / access areas for WMUs 10/11/14; 30 acres for WMU 31; 20 acres of operational / access areas for WMU 31; 12 acres for WMU 32; and 7 acres of operational / access areas for WMU 32.

The overall purpose of the project is to close the inactive WMUs in compliance with the RWQCB WDR Order No. R2-2004-0056 (Attachment B) and to conduct corrective action as required by the USEPA Order 3008h Administrative Order (Resource Conservation and Recovery Act [RCRA] Order No. 09-89-0013) (Attachment C).

The WMU's currently include contamination that the state and federal agencies with jurisdiction over the project site have determined needs to be remediated. The California Regional Water Quality Control Board Order No. R2-2004-0056, includes the following descriptions of the Waste Management Units (WMUs 10, 11, 14, 31, 32) that are proposed for clean-up (excerpted):

j. WMU-10 (EPA No. 4.25) - Oily Sludge Land Farm: This unit is an unlined inactive, 10.4-acre land-farm made up of two cells that operated from 1966-1976. The land treatment unit received approximately 10,600 cubic yards of oily wastes, and waste from the API Separator and dissolved air flotation (DAF) units. The unit is located in the 100-year flood plain, and is protected from flooding by 3 to 4-foot high dikes constructed around the perimeter. Depth to groundwater beneath the unit ranges from 1 to 7 feet bgs.

i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, and chromium), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, and petroleum hydrocarbons. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of both human health and ecological bench marks. To date, neither corrective action nor additional risk assessment have been completed. TEL and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells.

ii. Closure Status: During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact and the pumping of ponded water from the unit. The unit does not have a soil cover, and therefore, contains exposed waste.

k. WMU-11 (EPA No. 4.25) - Oily Sludge Land Farm: This unit is an unlined and inactive 7.2-acre land farm with a period of disposal from 1966-1976. The land treatment unit received oily wastes, petroleum sludges, and waste from the API Separator and DAF units. This unit is located in the 100-year flood plain, and is protected from flooding by the dikes constructed around the perimeter.

i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, and chromium), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, arsenic, and petroleum hydrocarbons. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA)

recommended corrective action or a Phase III HHERA based on exceedances of both human health and ecological benchmarks. To date, neither corrective action nor additional risk assessment have been completed. TEL, petroleum oil and grease, TPH motor oil, and nickel shall be added to the self-monitoring program analyte list.

ii. Closure Status: During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact. In addition, ponded water is pumped from the unit to the refinery's water treatment plant. The unit does not have a cover, and therefore contains exposed waste. . .

. . . m. WMU-14 (EPA No. 4.13) - Oily Sludge Land farm: This unit is an unlined inactive, 9.1-acre pond system that was constructed over the western portion of WMU-10 in 1976. The unit is made up of four sludge-drying beds that received sludge until the late 1970's from biologically treated refinery wastewater. This unit is located in the 100-year flood plain, and is protected from flooding by 2 to 5 foot high dikes constructed around the perimeter of the unit. However, during the wet season the unit may contain ponded water.

i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead, selenium, and chromium), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, lead, chromium, hexavalent chromium, and petroleum hydrocarbons. The August 15, 1999 Phase II Human Health and Ecological Risk Assessment (HHERA) recommended corrective action or a Phase III HHERA based on exceedances of both human health and ecological benchmarks. To date, neither corrective action nor additional risk assessment have been completed. Selenium, TEL, and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells.

ii. Closure Status: During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact and the pumping of ponded water from the unit. The unit does not have a cover, and therefore contains exposed waste. . .

. . . p. WMU-31 (EPA No. 4.29) - Oil Sludge Landfill: This unit is an approximately 21acre unlined and inactive landfill, with a period of disposal from the 1950s to 1960s. A TEL blending facility was located on the west side of the unit, and may have impacted the unit. Adjacent to the site is a former drum storage area and oil skim ponds. The unit received oily wastes and dredge spoils from the former Oily Water Canal. This unit is underlain by up to 6.5 feet of oily sludge and is partially underlain by free-phase petroleum hydrocarbons (FPLH). During wet weather, portions of the unit may pond.

i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead), TEL, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, zinc, and petroleum hydrocarbons. TEL, petroleum oil and grease, and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells. Provision No. 7 of this Order requires that monitoring wells be installed outside the clean water canal and adjacent to the marsh.

ii. Closure Status: The site currently contains former ponds, pits, and an open tank with petroleum waste. Other waste in the form of glass and rubbish is evident. The unit does not have a cover, and therefore, in general, contains exposed waste.

q. WMU-32 (EPA No. 4.27): This unit is a 10.7-acre area located adjacent to WMU-16. There are impacts to the area that indicate that releases have occurred. A drum reconditioning facility was located 700 feet east of the unit where historical aerial photographs reveal stockpiles containing thousands of drums. The unit's area at one time contained north and south trending drainage canals, which may have received oily and contaminated water. The unit is partially underlain by FPLH, which likely emanates from the Tract 3 tank farm. The unit has recently been the subject of further investigation and interim corrective measures to mitigate low pH conditions.

- i. Contamination: The unit's waste contains petroleum hydrocarbons, metals (i.e. lead), TEL, low pH soil, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, nickel, chromium, zinc, benzene, and other petroleum hydrocarbons. Low pH has also been reported in groundwater beneath the unit. TEL, TPH gasoline, TPH diesel, and TPH motor oil shall be added to the self-monitoring program analyte list for interior wells.
- ii. Closure Status: The soil cover needs grading and the hydraulic performance of the partial cover is unknown.

The RWQCB Order is designed to ensure that the WMUs meet the requirement of Title 27, Division 2, of the California Code of Regulations and Division 7 of the California Water Code, to promote the health, safety and welfare of the people of the State of California and to protect the environment. The Order also establishes the measures which the RWQCB deems necessary to protect the established beneficial uses of the areas surface and ground water. As provided in the San Francisco Basin Plan, and referenced in the Order, these uses include (among others) drinking water supply, wildlife habitat, preservation of rare and endangered species, fish migration and spawning, and estuary habitat.

In its Administrative Order (Resource Conservation and Recovery Act [RCRA] Order No. 09-89-0013), the Environmental Protect Agency found that the hazardous material found on the site could impact wildlife in the vicinity, noting:

“ . . . Potential receptors include personnel at the Facility and the salt marsh harvest mouse. The salt marsh harvest mouse is classified under the Endangered Species Act as an endangered specie. Other potential receptors may include fish and water fowl using the Suisun Bay for migration and habitat purposes. . . ”

Both the State and Federal governments have determined that remediation of the WMUs is necessary based in part on findings that the contaminants found therein could adversely affect wildlife in the adjacent Suisun Bay marsh habitat. It can therefore be reasonably concluded that the State and Federal governments would concur that the removal of those same contaminants would reduce the potential effect of such contaminants on wildlife in the adjacent marsh, including the CRR.

ANALYSIS

The proposed project includes the clean-up of hazardous materials from the following:

- WMUs 10/11/14: Consolidation of Wastes and Capping at WMU 14 under a Title 27 Prescriptive Cover;
- WMU 31: Clean Closure and Relocation of Wastes to WMU 14; and
- WMU 32: Engineered Alternative Low-Permeability Cover.

The Action Area totals approximately 110 acres, including approximately 45 acres of waters of the U.S. of which approximately 34 acres are seasonal wetlands. In their current state, these features constitute very low quality features which are unable to provide many of the functions and values typically associated with wetlands due to the contamination present and their disturbed nature.

Following remediation of the WMUs, the project will restore approximately 38.2 acres of seasonal wetlands on the project site. These wetlands will be remediated and re-constructed immediately adjacent to the Point Edith marsh. Following remediation, these seasonal wetlands will provide habitat

for wildlife species, including potential food sources for the CRR, will provide high water refuge habitat for CRR, will treat stormwater runoff entering the Suisun Bay and provide a buffer for Point Eden Marsh.

It is documented that CRRs benefit from being located in the vicinity of clean resources. The U.S. Fish & Wildlife Service published “Factors Affecting Reproductive Success of the California Clapper Rail (*Rallus longirostris obsoletus*) in San Francisco Bay”, in 2003 (Attachment D). This study evaluated the contributing factors to either nest failure, or success, at six tidal marshes located throughout the San Francisco Bay margins. The study found that 1) 69% of assessed eggs evaluated were viable, 2) 45% of nests successfully hatched at least one egg, and 3) despite clutch sizes of 6.66 at the North Bay sites, only 1.9 young were produced per nesting attempt. The research evaluated factors in reduction of nest success and found that predation accounted for the largest losses, while non-viable eggs showed evidence of chemical contamination. The report found that contamination appeared to exert an adverse effect on hatchability:

“While all marshes had impaired hatchability, the marshes with the lowest hatchability were also adjacent to potential contaminant sources— a hazardous waste site near Laumeister and an oil refinery near Wildcat.”

Research on refuge habitats by Overton et. al (Attachment E), found that CRR experience habitat limitations (and reduced survival) during periods of tidal inundation in areas that do not provide sufficient escape cover (high tide refuge), and recommends that supplementation or inclusion of high tide refuge area in conservation actions. The research found that CRR show strong clustering during high tidal events, and were willing to utilize artificial refuge structures at rates at least 300 times more frequently than would be expected if CRR used them proportional to their availability alone. The implication for conservation of CRR is that high tide refuge areas may be a significant contributing factor to recovery, and that efforts should be made to include these as components in management areas.

While the seasonal wetlands currently existing at the WMUs do not currently represent habitat for California Ridgeway’s rail, we believe that the clean-up and restoration of over 38-acres of seasonal wetland that is adjacent to potential habitat represents a significant contribution to recovery of CRR in the future. The quality of the adjacent marsh habitat will be improved. If, in the future, CRRs colonize the adjacent marsh at Point Edith they would benefit from the presence of higher functioning seasonal wetlands and the absence of contamination in the vicinity. The USFWS has identified buffer zones to marsh habitat as a recovery factor (to buffer from human disturbance and predators), to provide refuge to CRR during high tide / high water events, and seasonal wetland features that are adjacent to occupied marsh represent a significant contributing (buffering) factor. Additionally, if a breeding population of CRR were to colonize the marsh, then a clean-up of the adjacent buffer areas may have a positive effect on egg viability.

It is clear that all of the resource agencies are in support of hazardous waste clean-up and abatement. We are certain that the USFWS will agree that the permanent restoration of 38.2-acres of seasonal wetland will have net beneficial effect to wildlife in the adjacent marsh. It is the position of the USFWS that construction noise may affect CRR in the marsh habitat adjacent to the project site during construction. Such noise is, by nature of the proposed construction schedule, temporary, whereas restoration of clean seasonal wetland will result in long-term beneficial effect to the adjacent marsh due to buffering and overall improved environmental condition. The USFWS

has indicated that a reasonable mitigation for the proposed effect to CRR could be calculated at 11.5-acre (roughly the size of CRR territory), based on the duration and calculated chance of encountering CRR in the adjacent marsh (available potential territory). Presumably this assumes that there would be short-term (one nesting season) negative effects to a pair of CRR that would result in a season of reproductive failure.

ART respectfully suggests that the long-term benefits derived from the restoration of 38.2-acres of seasonal wetland that is adjacent to the potential CCR habitat would more than offset the potential temporary impacts to this same habitat. The potential impacted territory would be improved in perpetuity by removal of adjacent contaminants and restoration of the seasonal wetland form and function (aka Beneficial Uses) identified by both the State Water Quality Control Board, and the US Environmental Protection Agency. Conversely, should the WMUs remain in their current condition, the same Beneficial Uses identified by the State and Federal governments would remain impaired. Based on years of work on the refinery site, including multiple years of negative protocol level surveys in the adjacent marsh as well as project consultant's level of expertise with the CCRs, we are convinced that the efforts by the agencies and the ART team will result in improved marsh conditions overall and improved habitat for CRR.

Thank you for your consideration. We look forward to discussing on our scheduled 1:00 pm July 5th conference call.

Respectfully,

A handwritten signature in blue ink, appearing to read 'Cameron Johnson', is written over a light blue horizontal line.

Cameron Johnson

Johnson Marigot Consulting, LLC

Attachment A – Correspondence of May 15, 2017



May 15, 2017

Ms. Jana Affonso
Bay-Delta Fish and Wildlife Office)
650 Capitol Mall, 8th Floor
Room 8-300
Sacramento, CA 95814

Subject: Section 7 Biological Assessment, WMUs 10/11/14, 31, & 32 (USFWS File Number 08ESMF00-2012-TA-0213-2)

Dear Ms. Affonso,

Thank you for arranging a conference call on April 10, 2017 to discuss the draft biological assessment and the California Ridgeway's Rail (CRR) effects determination associated with the clean-up and closure of Waste Management Units (WMUs) 10/11/14, 31, and 32 at the Tesoro Martinez Refinery in Martinez, California. In addition to addressing our varying perspectives on the status of CRR at the Tesoro Martinez Refinery site and the effects of the WMU closures, we discussed the Fish and Wildlife Service (USFWS) proposal for mitigation and suggestions for minimization of effects to the CRR.

In short, staff from USFWS recommended a 1:1 (acre for acre) ratio of offsite restoration of CRR habitat at the San Francisco Bay Complex National Wildlife Refuge for each acre of potential habitat in the adjacent Point Edith Marsh that is subjected to a 5 decibel (db) average increase in the ambient noise level.

As is detailed below, we believe that the best scientific evidence available clearly demonstrates that no CRR will be impacted by the clean-up activity and that ultimately, the clean-up activity will improve the quality of potential habitat in the area and will provide mitigation within the Suisun Bay Recovery Unit for the salt marsh harvest mouse and wetlands. Further, the level of additional mitigation requested is simply not warranted and is economically not justified in this situation.

First, I would like to provide some background for our response. As more fully discussed in our February 8, 2017, letter to Joseph Terry on this issue (Attachment 1), it is the opinion of WRA, Tesoro's biological representative, and the closure team that it is unlikely the activities associated with the proposed clean-up and closure would cause disturbance to CRR that could be defined as "take" under the Endangered Species Act (ESA).

This conclusion is premised on years of protocol level surveys conducted at the site as well as a deep familiarity with the site and the surrounding areas. Based on direction from the USFWS, WRA conducted intensive protocol-level surveys for CRR. While the CRR is a secretive marsh bird, where they do reside they can be readily detected with a concerted survey effort such as those we have completed. After 7 years of surveys (an

effort of 332 hours over 80 days) conducted by USFWS permitted biologists, no CCR have been detected in the survey area since 2009.

While the detection of one CRR during a single survey event 8 years ago approximately 340 feet from WMU 31 inside Point Edith Wildlife Area, indicates that the some areas support potential CRR habitat, the seven years of negative surveys indicates that it is highly unlikely that a “population” of CRR currently occupy the adjacent marsh.

The proposed project involves the closure and cleanup of WMUs 10/11/14, 31, and 32 to meet the requirements of the San Francisco Bay Regional Water Quality Control Board (RWQCB) and corrective action to meet the requirements of the United States Environmental Protection Agency (USEPA). The proposed cleanup and closure is specifically intended to mitigate on-site hazardous materials, and will result in a benefit to CRR habitat in Suisun Bay.

In the current condition, and due to a reasonable interpretation of the survey effort data, it is highly unlikely that any CRR would be harmed or harassed by the cleanup actions in the adjacent WMUs, specifically because we do not believe that CRR are currently occupying the marsh.

In addition, even if an individual or a few individual CCRs happened to be in the area during the closure efforts, we believe that it is unlikely that the CCR would be harmed in or harassed. There will be no direct impacts to any potential habitat. The only potential indirect impact would be associated with noise disturbance during the breeding season.

To assess this potential impact, ART also followed the recommendation of the USFWS and in 2014 contracted for a technical study to be conducted by an acoustic professional. I have included the results of the acoustic study for your review (Attachment 2, the Extant Acoustical Consulting June 3, 2014 technical memorandum).

We believe that this study supports the conclusion that there will be no impact on any CCR present as the area is already subject to high ambient sound levels and therefore, any CCR present would be accustomed to such noise.

The existing setting of the refinery and WMU closures includes high activity and ambient sound levels. In addition to ongoing and routine refinery activities (keeping in mind the refinery has been continuously operating on this site since 1913), there are main line railroad tracks that run adjacent and through the action area (see figures in technical memorandum). Along these tracks there are 42 trips of Amtrak passenger trains that run between 5:30 am and 11:30 pm (one trip every 22 minutes) on most days. In addition, there are frequent freight trains that run 24 hours a day, 7 days a week on this high-volume traffic line resulting in an ongoing high noise level environment.

The acoustic study showed that the maximum noise proposed by the project did not exceed the maximum current noise levels (Figures 3 and 5) that occur at the project site on a regular and recurring basis. Therefore, the overall ambient rise should be considered

in the context of a less than pristine and ongoing (disturbance wise) environment that is not within the control of the refinery.

We also note that there is not clear consensus on the level of increased noise which would likely lead to harm or harassment of CCRs. The acoustic study and our June 6, 2014, transmittal letter (Attachment 3) discussed some references on the effects of noise, including a 2006 technical memorandum issued by the USFWS that suggests levels of 20-25db is an appropriate threshold to determine adverse or demonstrable effects to avian species.

Based on the response to our proposal, we understand that the USFWS current position is that a 5db average increase in any area of potential habitat could result in a take of a CCR. The only reference citing disturbance used by the USFWS is a 1995 Master's Thesis on CCR* ecology (Attachment 4). A single observation by the author documented a CCR that abandoned its territory but the thesis was not definitive that the "adjacent" PG&E activities on an overhead transmission line was responsible, nor did the author specify the distance or dB levels. We do not believe that this study of a single event at an isolated marsh is reflective or predictive of the situation at the refinery.

We note that the Extant Acoustical Study did discuss the 5db threshold as the point "...that fosters a noticeable change in human response..." (Attachment 2, Appendix A-page 4). The acoustic study is thorough in its discussion of the context of a 5db change, and our interpretation is that given the context and setting of the proposed action (high ambient activity and acoustic volume), the addition of noise by the proposed project is consistent with the existing ambient condition, and it would be difficult to detect differences by a human or a CRR located in the adjacent marsh (hundreds of yards away).

Based on this data, USFWS has determined that there is a potential for take of CCR to occur in all suitable habitat that incurs a 5db increase in ambient (average) noise levels, and this impact could be mitigated by providing offsite mitigation for all impacted acreage at a 1:1 ratio.

This potential for take of CCR has not been expressed in previous BiOps issued for other work at the Refinery. The USFWS provided Tesoro a BiOp in May of 2015 for work conducted adjacent to and north of the proposed WMU clean-up and closures and adjacent to the Point Edith Wildlife Area entitled *Formal Consultation on the Tesoro Refining and Marketing Company's (Tesoro) Proposed Avon Marine Oil Terminal Engineering and Maintenance Standards (MOTEMS) Compliance Project near the City of Martinez, Contra Costa County, California (U.S. Army Corps of Engineers (Corps) file number 2010-00200S)*.

The MOTEMS BiOp does not include compensation for noise impacts to CRR. This project included earth moving and the use of heavy equipment, but also analyzed the effects of multiple cranes, demolition of structures, and installing over four hundred piles with vibratory and impact hammers. The work was described in the BiOp as expected to

have a temporary “slight increase” in noise when the ambient noise from refinery and wharf operations were considered.

Mitigation was offered in consideration of MOTEMS impacts resulting from ground disturbance and vegetation removal. No compensation was offered for noise disturbance extending into the Point Edith Wildlife Area. ART expects the analysis and conclusions of the WMU Closure Project to be similar to this BiOp: that any noise increase is negligible and temporary.

Implementing this proposed, additional mitigation would be extremely burdensome. To provide an acre of mitigation (estimated cost \$65,000 per acre) for every acre of suitable habitat that is subject to a temporary rise of 5db over ambient during the portions of the clean-up activities, would cost \$6,300,000. Discussions with the USFWS (Joseph Terry) have suggested a reduced mitigation ratio may also be appropriate but even at a 0.5:1 acre for acre ratio, the cost implication to Tesoro is approximately \$3,100,000.

The WMU Closure Project currently offers mitigation at two Suisun Marsh locations for unavoidable impacts to Waters of the US and salt marsh harvest mouse habitat. The mitigation will benefit the Suisun Bay Recovery Unit and listed species within. The compensation offered to the US Army Corps of Engineers is wetland creation credit purchase at the North Suisun Mitigation Bank. This bank lies within the Suisun Bay Recovery Unit of the Service’s Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California (2013).

Compensation offered to the USFWS for unavoidable impacts to potential salt marsh harvest mouse habitat is proposed at the Cordelia Slough Preserve, located within the Suisun Marsh complex (and the Recovery Unit) west of Joice Island along Cordelia Slough. There are documented rail occurrences near Joice Island and the Preserve, and tidal marsh habitat along Cordelia Slough is part of the Preserve holdings. The mitigation offered in the project description will benefit the Suisun Marsh and the listed species in the Recovery Plan, including CRR.

We do not believe that any mitigation is required because:

1. the adjacent marsh is potential CRR habitat, but adjacent marsh will not be physically or hydrologically effected by the proposed project,
2. a lack of recent CRR detections in the action area for the past 8 years and seven survey seasons suggests that CRR are not currently occupying the project area or the adjacent marsh,
3. there are no expected direct impacts to existing CRR habitat associated with WMU closure and ultimately the clean-up and closure will result in restoration of habitat for CRR, and
4. the temporal nature of the project is relatively short in duration.

We do not believe that either CRR or habitat for CRR will be negatively affected by the proposed clean-up and closure project, and therefore we respectfully decline to include

the suggested mitigation measure into our project description. The proposed project purpose is clean-up and abatement of hazardous materials, and the USFWS' policies typically support these goals within aquatic systems. The addition of \$6.3 M to a project specifically designed to mitigate and restore wetlands is overly burdensome given the low likelihood of any impact to CRR.

The differing perspectives are based on well-intentioned professional opinion and interpretation of data, which is not unexpected. Therefore, based on the unresolved issues and concerns associated with the significant economic burdens on the project from the recommended minimization measures and the anticipated continued delays in the State-ordered closure of the WMUs, we are seeking acceptance of our findings, or a higher level of discussion and review of the situation.

Our request is that the USFWS provide ART with a DRAFT copy of their proposed biological opinion on the proposed action as described in the January 2017 Biological Assessment as soon as possible. If USFWS staff is unable to provide an opinion that supports the clean-up and closure, we request assistance from higher level USFWS management.

Sincerely,

Ken Sanchez
WRA, Inc.

CC:
Joseph Terry, Sacramento Fish and Wildlife Office
Frankie Malamud-Roam, US Army Corps of Engineers

Attachments:

- Attachment 1. Section 7 Biological Assessment, WMUs 10/11/14, 31, 32
- Attachment 2. WMUs 10/11/14, 31, and 32 Closure Project Acoustic Study
- Attachment 3. Waste Management Units 10/11/14, 31, and 32 Closure Project Acoustic Study Results and Applicant Proposal to the USFWS
- Attachment 4. 1995. Albertson. J. Ecology of the California Clapper Rail in the South San Francisco Bay.



February 8, 2017

Joseph Terry
US Fish & Wildlife Service
Sacramento Fish and Wildlife Office
Coast-Bay Division
2800 Cottage Way, Suit W-2605
Sacramento, CA 95825-1846

RE: Section 7 Biological Assessment, WMUs 10/11/14, 31, & 32 (USFWS File Number 08ESMF00-2012-TA-0213-2)

Dear Mr. Terry,

I write on behalf of the Avon Remediation Team (ART) to request a meeting with you and Ryan Olah to discuss the potential for the Tesoro Martinez Refinery Waste Management Unit (WMU) Closure Project (Project) to affect the California Ridgway's Rail (CRR). As detailed in the Project's revised 2017 Biological Assessment (BA), we believe that the best scientific and commercial information available clearly demonstrates that the Project is not likely to adversely affect the CRR. Given this evidence, the measures suggested in your email of January 25, 2017, including significant limitations on construction schedules during CRR's breeding season, are unnecessary. It is critical that we resolve this issue given that imposition of these restrictions on the Project would significantly impair ART's ability to carry out this important clean-up project, a project that is not only mandated by the Regional Water Quality Control Board (RWQCB) and the U.S. Environmental Protection Agency (EPA) but will also contribute to the improved eco-system of the San Francisco Bay.

The determination included in the BA is based on rigorous surveys conducted in an effort to establish an understanding of CRR presence and use of the marshes adjacent to the work areas (recalling the fact that no construction will occur on or in suitable habitat for the CRR). After three consecutive years of surveys (seven consecutive years at WMU 32) conducted by experienced biologists permitted by the U.S. Fish and Wildlife Service, no CRRs were detected. It is our opinion and conclusion that the activities proposed to be conducted year-round over the next 2-3 years are unlikely to affect CRRs as they do not appear to be utilizing the adjacent marsh lands. If no CRRs are present, then increased noise level certainly cannot have an effect.

We do not agree with the conclusion included in your email that the acoustic studies completed on the site demonstrate a need to do further surveys. While the acoustic studies did demonstrate that the level of sound from the proposed action would be "above ambient" levels, our studies were not conclusive and certainly did not lead us to a determination that the effects were likely to adversely impact the breeding, feeding, or sheltering activities of CRRs that may be in the area. It is unclear that the level of noise that may (or may not) travel into the marsh area combined with the baseline levels of noise already present on the project site from the rail traffic and ongoing refinery operations, wind direction, etc. would rise to the level of significance and result in harm to CRRs. We are unaware of other studies of a similar nature that could be compared and used

to reach a conclusion regarding effects that may rise to the level of "harm" as defined in the regulations.

What the acoustic study does demonstrate, however, is that the ambient level of noise in the marsh areas that are adjacent to the Project site is higher than would typically be found in such areas. In assessing potential for there to be an effect, it must be noted that the project activities, when begun, will be hundreds of feet from any suitable habitat. Should CRRs use these areas for any of their biological needs, it can be assumed the ongoing activities from the project and other sources (refinery, railroad, etc.) are not deterring them from such use. Accordingly, we see no need to continue to conduct surveys.

In summary, it is our conclusion based on the biological data collected and presented that the proposed action would not significantly impair the ability of the CRR to breed, feed, or shelter and that any restrictions arbitrarily placed on project timing would pose a significant burden on our ability to successfully and safely complete the clean-up.

As noted, we would like to meet with you and Ryan at your earliest convenience. I will contact you over the next couple of days to arrange a date.

Sincerely,

A handwritten signature in black ink, appearing to read "Ken Sanchez". The signature is written in a cursive, flowing style.

Ken Sanchez
WRA, Inc.

APPENDIX E – PACIFIC POND TURTLE SURVEYS

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G



DAILY CONSTRUCTION REPORT

DATE: June 18, 2012

Project Phase(s): Pre-fence installation/grading Monitor(s): P. Valcarcel
Pacific Pond Turtle Survey

Weather Conditions AM: breezy, clear ~~N/A~~ 60s PM: breezy (~10 mph), sunny, warm (~75-80)
Time on Site: 8-8:45 To + 13:45-14:55

Site Conditions: Dry Moist Saturated Inundated (no work in inundated areas)

Biological Monitoring:

Special status species observed: Yes ___ No X If yes, fill out the following:

(circle): PPT / Other (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
EUR. Starling	N/A	N/A	N/A
ANHU			
ROPI			
NOMO			
WEFL			
RWBB			
KILL			
MAWR			
SOSP			
MODD			

crayfish
mosquito fish

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G (C O N ' T)

General Construction Area Inspection:

Species observed Y N If yes, describe: _____

No target species observed in work area, and no species observed
in area to be graded.

MAWR, SOSP, WEFL, RWBB observed in area fence to be replaced, but no
breeding birds

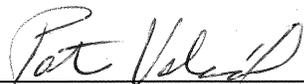
Fence Condition ripped in some places → fence to be replaced tomorrow

GENERAL OBSERVATIONS / NOTES: _____

Staging of equipment occurring during survey +
marking/staking new fence line.

Water is low in the wetland, less than ^{or about} 1 foot in the
deeper ~~area~~ areas.

No beavers were seen during the pond turtle survey, nor evidence
of them. pond turtle survey techniques include sitting + listening
and using binoculars, so there was plenty of opportunity to
observe ~~these~~ beavers if there.



WRA Construction Monitor

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G



DAILY CONSTRUCTION REPORT

DATE: 7/2/12

Project Phase(s): Wmu-4 - Filling Sand bags
Start of excavation south
west corner - planned for afternoon

Monitor(s): Dan Chase

Weather Conditions AM: Clear, wind 7-10 wsw, temp=63°F PM: warm, clear, wind w.5, temp=85°F

0630 2 ART TRAIL
Time on Site: 0730 To _____

Site Conditions: Dry Moist Saturated Inundated (no work in inundated areas)

Biological Monitoring:

Special status species observed: Yes ___ No X If yes, fill out the following:

(circle): PPT / Other (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
RWBS	Wmu-4	P/A	Am
Kill (killer)	" "		
SoSp	" "		
Nomo	" "		
Ropi	" "		
ETHa	" "		
Ca Groundsquirrel	Staging Area		
EUST	Wmu-4		Pm
Western Fence Lizard	Wmu-4		

WMU 4 CONSTRUCTION
MONITORING LOG



DAILY CONSTRUCTION REPORT

DATE: 9/19/2012

Project Phase(s): Pre-Marsh disturbance Monitor(s): Dayna Avagon
NE Marsh in Matt Osowski
- Before turbidity curtain installation

Weather Conditions AM: Sunny PM: Sunny, Breezy

Time on Site: 7:50 To 11:50

Site Conditions: Dry Moist Saturated Inundated (no work in inundated areas)

Biological Monitoring:

Special status species observed: Yes No If yes, fill out the following:
Pacific or Western Pond turtle = same species name
(circle) WPT / Other (Fed/State): _____

Location (first/last seen): _____

Time (sighting): _____ Biologist Contacted: Yes N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes No PPT observed

Other species observed:

Species	Location Found	Relocation Area	Time Found
<u>western pond lizard</u>	<u>On site</u>	<u>—</u>	<u>10</u>
<u>Red-tailed Hawk</u>	<u>flying overhead</u>	<u>—</u>	<u>10:15</u>
<u>marsh wren</u>	<u>marsh E of site</u>	<u>heard</u>	<u>ongoing</u>
<u>Red-wing Blackbird</u>	<u>Marsh E of site</u>	<u>heard not seen</u>	
<u>mosquito fly</u>	<u>Marsh E of site</u>	<u>—</u>	

air monitoring:

Dayna = WAA01
Matt = WAA02

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G (C O N ' T)

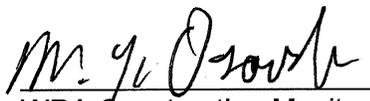
General Construction Area Inspection:

Species observed Y ___ N If yes, describe: _____

Fence Condition ⁱⁿ good repair. aquatic material
laydown area needs repair when material is
placed.

GENERAL OBSERVATIONS / NOTES: _____

Except for area of exposed marsh
in the NE corner, the construction
area is excluded.


WRA Construction Monitor

WMU 4 CONSTRUCTION
MONITORING LOG



DAILY CONSTRUCTION REPORT

DATE: Saturday, 9-22-2012

Project Phase(s): Beam Construction

Monitor(s): Matt Osowski

Weather Conditions AM: Sunny, 75°F
Time on Site: 0900 To 1300

PM: Sunny 80°F

Site Conditions: Dry Moist Saturated Inundated (no work in inundated areas)

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following:

(circle): WPT / Other (Fed/State): NA

Location (first/last seen): NA

Time (sighting): NA Biologist Contacted: Yes ___ N/A (why) _____

Biologist Contact Details: Name _____ Time _____ Phone _____ Email _____

Notes no species

Other species observed:

Species	Location Found	Relocation Area	Time Found
white-tailed kite	flying East of site	—	10:30
western fence lizard	seasonal wetlands	—	ongoing
turkey vulture	flying overhead	—	10:45
Red-tail hawk	flying overhead	—	11:30
ground squirrel	uplands -S.	—	9:45

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G (C O N ' T)

General Construction Area Inspection:

Species observed Y ___ N ___ If yes, describe: _____

Some ground squirrel burrows observed

Fence Condition good, no rips

~~Juniper fencing for aquatic material lay down needs repair~~

GENERAL OBSERVATIONS / NOTES: _____

On site for pre-marsh disturbance monitoring
no species observed in marsh areas.

Bever in NE corner needs to be
constructed to complete exclusion
of construction site


WRA Construction Monitor

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G



DAILY CONSTRUCTION REPORT

DATE: 9-24-2012

Project Phase(s): WMU-4 construction Monitor(s): Matt Osowski
NE Marsh Beam Building

Weather Conditions AM: 60's clear PM: NA

Time on Site: 7:00am To 9:15am

Site Conditions: Dry Moist Saturated Inundated (no work in inundated areas)

Biological Monitoring:

Special status species observed: Yes ___ No If yes, fill out the following: none observed

(circle): PPT / Other (Fed/State): NA

Location (first/last seen): NA

Time (sighting): NA Biologist Contacted: Yes ___ N/A (why) ___

Biologist Contact Details: Name ___ Time ___ Phone ___ Email ___

Notes _____

Other species observed:

Species	Location Found	Relocation Area	Time Found
<u>fence lizard</u>	<u>near enclosure fencing</u>	<u>none</u>	<u>8:00</u>
<u>redwinged Blackbird</u>	<u>in marsh</u>	<u>project area</u>	
	<u>out of</u>		

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G (C O N ' T)

General Construction Area Inspection:

Species observed Y ___ N If yes, describe: _____

Fence Condition good no tears observed. Vegetation
lay-down area fence in good condition

GENERAL OBSERVATIONS / NOTES: Envirocon is completing
Beem around marsh, will exclude
project area when Beem is complete



WRA Construction Monitor

W M U 4 C O N S T R U C T I O N
M O N I T O R I N G L O G (C O N ' T)

General Construction Area Inspection:

Species observed Y ___ N If yes, describe: _____

Fence Condition good, no rips, apron buried.

GENERAL OBSERVATIONS / NOTES: walked area waste removal
to be conducted in an adjacent area
outside of current project perimeter.
pre-disturbance survey outline area
on foot, w/ no findings of special
status or protected plants/animals.

* See attached map of survey area

* Photos posted from visit of survey
area


WRA Construction Monitor

WMU 4
Golden Eagle Refinery
Martinez, California

*pre-construction
survey for
waste removal
expansion*

WMU 4 Closure Plan
and Foster Wheeler
Pipeline

10/22/2012

area surveyed

*area is a
bit of seasonal
& perennial wetlands
no wildlife found
in surveyed area*

Legend

-  Biological Study Area
-  CCWD Water Pipeline
-  Limit of Cap
-  Limit of Excavation
-  Roads
-  Grading
-  WRA-well
-  Wetlands



0 50 100 200
Feet

Map By: SG
Map Date: June 2012
Base Source: ESRI Imagery

*Mark J. Smith
10/22/2012*

Appendix D
WMU 32 Closure Concept Changes Impact
Assessment Memorandum, Prepared by WRA,
2023;
Biological Opinion, prepared by the U.S. Fish
and Wildlife Service, 2017

MEMORANDUM

TO:	J. Mark Inglis, ART Anju Wicke, ART	FROM:	Matt Osowski, WRA, Inc.
CC:			
DATE:	November 15, 2023		
SUBJECT:	WMU 32 Closure Concept Changes Impact Assessment		

The WMU 32 closure concept previously described an approach where the accessible WMU footprint would be covered with a low-permeability cover, consisting of erosion-resistant gravel, rock, or other non-vegetated material, consistent with the RWQCB Groundwater Protection Division's recommendations. A recent development in the closure approach will preserve the evaporative function of the former Salt Water Canal to maintain local groundwater gradients as an uncovered, low-elevation feature of the closed WMU. A structure is proposed to isolate WMU 32 from the surrounding refinery and is designed to exclude wildlife.

The revised WMU 32 closure approach includes a roof structure with a perimeter wall of fencing that will exclude wildlife. The perimeter fencing will be composed of several types of exclusion barriers constructed from below ground surface continuously to the roof structure. The perimeter fence includes a buried, solid smooth fence (metal or equivalent) to exclude small ground-dwelling wildlife. Bird-deterrent mesh will be installed from top of the buried smooth fencing up to the eaves of the roof structure; the mesh will be maintained (in perpetuity) without sags or billowing areas to prevent any wildlife (e.g., birds, bats) from becoming entangled. Chain link fencing will also be installed to restrict personnel access. The structure will be under 30 feet in height and could cover up to approximately 11.2-acres of the WMU.

This memo considers any additional potential impacts the structure and fencing design may have on biological resources. These include impacts under both the California Environmental Quality Act (CEQA) and those to Federally listed (Endangered or Threatened) species. Impact assessments are within the respective contexts of the greater closure project's existing Initial Study Mitigated Negative Declaration (ISMND) document¹ and Biological Opinion from the U.S. Fish and Wildlife Service.²

¹ Stantec Consulting Services, Inc. 2019. Waste Management Unit Restoration Project, Initial Study Mitigated Negative Declaration. Prepared for the San Francisco Bay Regional Water Quality Control Board, Oakland, California. October.

² U.S. Fish and Wildlife Service. 2017. Biological Opinion on the Tesoro Refining and Marketing Company's Waste Management Units...Closure Project. File No. 08FBTD00-2017-F-0209. November.

California Environmental Quality Act Assessment

This section provides an assessment of potential impacts to biological resources under CEQA due to the revised closure approach for WMU 32. These thresholds were utilized in completing the analysis of potential project impacts for CEQA purposes. For the purposes of this analysis, a “substantial adverse effect” is generally interpreted to mean that a potential impact could directly or indirectly affect the resiliency or presence of a local biological community or species population. Potential impacts to natural processes that support biological communities and special-status species populations that can produce similar effects are also considered potentially significant. Impacts to individuals of a species or small areas of existing biological communities may be considered less than significant if those impacts are speculative, beneficial, de minimis, and/or would not affect the resiliency of a local population.

Elements of the CEQA checklist for biological resources are addressed individually below.

a. (Will the project) 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 U.S. Fish and Wildlife Service

As summarized in the “Special Status Species Summary” document by WRA³, no special-status plant species have been observed within or adjacent to WMU 32 to date, and these species are considered absent there. As such, the revised closure approach for WMU 32 will have no impact on special-status plants.

Appendix C of the ISMND summarizes special-status wildlife species with the potential to occur in or adjacent to WMU 32. The revised closure approach for WMU 32 will not result in any novel impacts to these species not already addressed in the ISMND for the greater WMU closure project. With two exceptions (see below), potential habitat within the WMU for these species (i.e., wetland vegetation and/or ruderal uplands) will be permanently removed via closure activities, and thus precluding wildlife from entering the post-closure WMU will not constitute a novel or new impact. This includes federal and/or state listed species. The structure wildlife exclusion barriers will be engineered and maintained in such a way as to preclude any potential for entanglement by flying species (birds, and bats).

For burrowing owl (*Athene cunicularia*), the wildlife exclusion barriers will preclude both this species and burrow-forming animals (namely ground squirrels) from entering the WMU footprint. Previous impacts assumed the low-permeability cover would preclude burrow-forming animals from burrowing into the cover. In the context of the total amount of marginal potential habitat for this species that is present within the greater refinery site (e.g., along relatively undisturbed roads and levees), loss of the footprint of WMU 32 is discountable. Additionally, permanently precluding any potential for burrowing owls to enter the post-closure WMU is arguably of benefit to the species given the presence of waste in the subsurface soils.

Similarly, marginal-quality potential (upland) nesting habitat for western pond turtle (*Actinemys marmorata*) is present within a portion of WMU 32. Precluding any future access to the post-closure WMU by western pond turtle is a discountable potential impact within the context of the

³ WRA, Inc. 2021. Special Status Species Summary, WMUs 10/11/14, 31, 32 Closure Project, Marathon Martinez Refinery, Martinez, Contra Costa County, California. September.

amount of suitable habitat in the vicinity, most of which is of substantially higher quality. Any potential suitable habitat would be lost or not accessible under the current design, with the exclusion structure. This is not a change in impacts from the previous closure approach where all available habitat would be covered with a low-permeability cover, consisting of erosion-resistant gravel, rock, or other non-vegetated material, rendering the post-closure WMU unavailable nesting habitat.

b. (Will the project) 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 U.S. Fish and Wildlife Service

As stated in the ISMND, WMU 32 does not function as a sensitive natural community and thus no impacts to such will result from closure. The revised closure approach for WMU 32 does not alter this conclusion.

c. (Will the project) 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

The revised closure approach for WMU 32 will fill the same area of wetlands as the previous approach. As outlined in the ISMND, permanent impacts to jurisdictional waters within WMU 32 will be sufficiently offset by compensatory mitigation measures. The revised closure approach for WMU 32 does not alter this conclusion.

d. (Will the project) 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

The ISMND concluded that the greater WMU closure project will have a less than significant impact on the movement of wildlife (including fishes) and use of wildlife nursery sites. While the revised closure approach will create a wildlife barrier around the WMU 32 footprint, it does not alter the conclusion of the ISMND. Firstly, any connectivity functions currently provided by the WMU 32 footprint would be limited to highly localized movement for common wildlife species that are already tolerant of industrial/developed and highly disturbed land covers. Furthermore, connectivity is only provided between the vicinity of WMU 31/Point Edith Wildlife Area and Lower Walnut Creek, a movement route which is of limited utility for most wildlife. Second, similar localized connectivity is provided via higher quality wetland habitat north of the Bio-oxidation Pond, and this area will remain unimpacted by the project. For these reasons, no potentially significant impacts to wildlife movement or wildlife nursery sites will result from the revised closure approach for WMU 32.

e. (Will the project) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance

As outlined in the ISMND, no impacts related to conflict with local policies or ordinances will result from the closure of WMU 32. The revised closure approach for WMU 32 does not alter this conclusion.

f. (Will the project) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan

As outlined in the ISMND, no impacts related to conflict with any approved local, regional, or state conservation plans will result from the closure of WMU 32. The revised closure approach for WMU 32 does not alter this conclusion.

Assessment for Federal Listed Species

Below is an assessment of potential effects to federal listed species resulting from the revised closure approach for WMU 32 in the context of the existing Biological Opinion for the greater WMU closure project. Species considered at salt marsh harvest mouse (SMHM; *Reithrodontomys raviventris*) and California Ridgway's (clapper) rail (CRR; *Rallus obsoletus obsoletus*), both Endangered. The categories of potential effects are those required of Endangered Species Act consultations and as found in the Biological Opinion.

Direct Effects

Direct effects are those that may occur during project implementation. While WMU 32 provides potential low-quality habitat for SMHM, the revised closure approach will have no direct effects on SMHM. Firstly, all potential habitat for this species will have been permanently removed prior to construction of the wildlife exclusion barriers so there will be no potential for take (mortality, injury, or harassment). Secondly, the loss of potential habitat will sufficiently offset by compensatory wetland mitigation measures as described in the Biological Opinion.

WRA 32 does not contain tidal wetlands and thus provides no potential habitat for CRR. As a component of closure activities, construction of the wildlife exclusion barriers will be within the thresholds of potential incidental disturbance to CRR already considered in the Biological Opinion and will not constitute a novel impact.

Indirect Effects

Indirect effects are those that may occur after project implementation, in this case following construction of the wildlife barriers at WMU 32. No indirect effects to SMHM that would alter the conclusions of the Biological Opinion are anticipated due to the revised closure approach. The barriers will be located a minimum distance of 65 feet from the nearest potential, low quality SMHM habitat and separated from it by hardscape or otherwise thoroughly disturbed and industrial land covers. The Biological Opinion assumed permanent loss of WMU 32 as potential habitat, which would include habitat for occasional movement.

WMU 32 provides no potential habitat for CRR in its current (pre-closure) state and no indirect effects to CRR will result from revised closure activities.

Cumulative Effects

Cumulative effects include those that may occur due to future actions (by State, Tribal, local, and/or private entities) within the assessment area. The Biological Opinion assessed potential cumulative effects due to ongoing and anticipated actions at the refinery site, and the revised closure approach for WMU 32 does not alter any of the conclusions associated with this analysis.

Summary

In conclusion, the revised closure approach (construction of wildlife exclusion barriers) around the perimeter of WMU 32 will not result in any novel potential effects to SMHM or CRR that have not already been addressed in the project's Biological Opinion.



United States Department of the Interior



FISH AND WILDLIFE SERVICE
San Francisco Bay-Delta Fish and Wildlife Office
650 Capitol Mall, Suite 8-300
Sacramento, California 95814

In Reply Refer to:
08FBDT00-
2017-F-0209

Mr. Rick Bottoms, PhD
Attn: Frances Malamud-Roam
Department of the Army
San Francisco District, U.S. Army Corps of Engineers
1455 Market Street, 16th Floor
San Francisco, California 94103-1398

NOV 20 2017

Subject: Biological Opinion on the Tesoro Refining and Marketing Company's (Tesoro) Waste Management Units (WMUs) 10/11/14, 31, and 32 Closure Project at the Golden Eagle Refinery (Refinery) in the City of Martinez, Contra Costa County, California (U.S. Army Corps of Engineers (Corps) file number 2008-00083S)

Dear Dr. Bottoms:

This letter is in response to the Corps' July 16, 2012, request for initiation of formal consultation with the U.S. Fish and Wildlife Service (Service) for the proposed Tesoro WMUs 10/11/14, 31, and 32 Closure Project (proposed project) at the Refinery in the City of Martinez, Contra Costa County, California (Corps file number 2008-00083S). Your request was received by the Service on July 17, 2012. At issue are the proposed project's effects on the federally endangered salt marsh harvest mouse (*Reithrodontomys raviventris*) and endangered California clapper rail (*Rallus longirostris obsoletus*). This response is provided under the authority of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act), and in accordance with the implementing regulations pertaining to interagency cooperation (50 CFR 402).

Recent genetic analyses of rail species resulted in a change in the common name and taxonomy of the large, "clapper-type" rails (*Rallus longirostris*) of the west coast of North America to Ridgway's rail (*Rallus obsoletus*) (Maley and Brumfield 2013, Chesser *et al.* 2014). The change in the common name and taxonomy of the California clapper rail, however, does not change the listing status of the species.

The Federal action on which we are consulting is the Corps' issuance of a permit to Tesoro pursuant to Section 404 of the Clean Water Act of 1972, as amended (33 U.S.C. § 1344 *et seq.*) to place fill in Corps jurisdictional seasonal wetlands to close the former WMUs at the Refinery pursuant to the San Francisco Bay Regional Water Quality Control Board (SFRWQCB) Waste Discharge Requirements (WDR R2-2004-0056) and the U.S. Environmental Protection Agency Administrative Order Resource Conservation and Recovery Act 09-98-0013S. Closure of the WMUs will be conducted by the Avon Remediation Team (ART). ART is a cooperative arrangement between the Refinery owner, Tesoro, and Texaco Downstream Properties Incorporated to address certain legacy environmental compliance requirements. Pursuant to 50

CFR 402.12(j), you submitted a biological assessment for our review and requested concurrence with the findings presented therein. These findings conclude that the proposed project may affect, and is likely to adversely affect the salt marsh harvest mouse, and may affect, but is not likely to adversely affect the California clapper rail.

In considering your request, we based our evaluation on the following: (1) the June 2012 *Section 7 Biological Assessment Waste Management Units 10/11/14, 31, and 32, Golden Eagle Refinery, Martinez, Contra Costa County, California* (WRA Environmental Consultants (WRA) 2012); (2) the November 2013 *Section 7 Biological Assessment Addendum Waste Management Units 10/11/14, 31, and 32, Tesoro Golden Eagle Refinery, Martinez, Contra Costa County, California* (WRA 2013); (3) the January 2017 *Section 7 Biological Assessment WMUs 10/11/14, 31, and 32, Tesoro Martinez Refinery, Martinez, Contra Costa County, California* (Biological Assessment) (WRA 2017a); (4) the August 26, 2016, letter from WRA to the Corps containing the revised project description (M. Osowski, WRA, *in litt.* 2016a); (5) annual protocol-level surveys for the California clapper rail conducted between 2008 and 2017 (WRA 2008a, 2008c, 2008d, 2009f, 2009g, 2009h, 2011b, 2012b, 2013b, 2014b, 2015, 2016a, 2016b, 2017); (6) the February 10, 2016, letter from WRA to the Service regarding the effects of construction noise (M. Osowski, WRA, *in litt.* 2016b); (7) the January 2015 *Final Cordelia Slough Preserve for Salt Marsh Harvest Mouse and Wetland Enhancement Long-Term Management Plan* (Wildlands 2015); (8) miscellaneous correspondence and electronic mail messages concerning the proposed project among representatives of the Service, the Corps, Tesoro, ART, WRA, Johnson Marigot Consulting, LLC, Morgan, Lewis & Bockius, LLP, and the SFRWQCB; and (9) additional information available to the Service.

The Service does not agree that the proposed project is not likely to adversely affect the California clapper rail. Although no suitable tidal marsh breeding habitat would be directly disturbed, breeding California clapper rails in the adjacent tidal marsh of the Point Edith Wildlife Area may be disturbed by construction noise from the proposed project. An acoustic study conducted for the proposed project shows construction of the proposed project will result in noise levels elevated 8 to 13 decibels above ambient conditions within the adjacent tidal marsh of the Point Edith Wildlife Area (M. Carr, Extant Acoustical Consulting, LLC, *in litt.* 2014) including an area where a California clapper rail was observed in 2009 (WRA 2015).

The remainder of this document provides our biological opinion on the effects of the proposed project on the salt marsh harvest mouse and California clapper rail.

Consultation History

- April - June 2009: The Service communicated with the Corps regarding the proposed project via electronic mail messages and a conference call.
- May 19, 2011: The Service attended a site visit to WMU 32 at the Refinery along with representatives from Tesoro, ART, and WRA to evaluate the potential effects on listed species from the proposed investigations needed at WMU 32 to refine the engineering design for the proposed project.

- January 25, 2012: The Service received from ART a letter requesting technical assistance regarding the proposed ongoing investigations and design studies at WMU 32 needed to refine the engineering design for the proposed project.
- April 12, 2012: The Service sent a technical assistance letter to ART stating that with the implementation of the proposed avoidance and minimization measures the proposed ongoing investigations and design studies at WMU 32 needed to refine the engineering design for the proposed project are not likely to result in the take of salt marsh harvest mice or California clapper rails (Service file number 08ESMF00-2012-TA-2013-1). The letter also stated that the Corps would initiate formal consultation for the implementation of the proposed project.
- July 17, 2012: The Service received from the Corps the first biological assessment for the proposed project (WRA 2012) and the request for initiation of formal consultation.
- August 21, 2012: The Service sent via electronic mail to the Corps and WRA comments on the first biological assessment and a request for additional information on the proposed project.
- October 30, 2012: The Service attended a conference call for the proposed project to discuss the Service's comments on the first biological assessment.
- February 19, 2013: The Service attended a site visit.
- April 4, 2013: The Service sent a letter to the Corps requesting additional information on the proposed project (Service file number 08ESMF00-2012-TA-2013-2, Service 2013b).
- April 18, 2013: The Service participated in a conference call for the proposed project.
- June 28, 2013: The Service attended a meeting for the proposed project with WRA, Tesoro, and ART.
- August 19, 2013: The Service attended a site visit to the proposed Cordelia Slough Preserve habitat compensation site with staff from ART, Wildlands, and WRA.
- September 16, 2013: The Service received from Wildlands the draft long-term management plan for the proposed Cordelia Slough Preserve habitat compensation site (Wildlands 2013).
- November 12, 2013: The Service received from the Corps a letter containing the addendum to the biological assessment (WRA 2013) and responding to the Service's request for additional information on the proposed project.

- November, 15, 2013: The Service sent via electronic mail to the Corps, Tesoro, ART, WRA, and Wildlands comments on the draft long-term management plan for the proposed Cordelia Slough Preserve habitat compensation site.
- February 10, 2014: The Service attended a site visit to the proposed project site with staff from the Corps, Tesoro, ART, WRA, and SFRWQCB.
- June 6, 2014: The Service received from WRA the acoustic study report evaluating the effects of noise from proposed project construction on California clapper rails in the nearby tidal marshes (M. Carr, Extant Acoustical Consulting, LLC, *in litt.* 2014; B. Clarke, WRA, *in litt.* 2014a).
- June 25, 2014: The Service sent via electronic mail to WRA, Tesoro, ART, and the Corps comments on the acoustics study report.
- June 30, 2014: The Service received from Wildlands the revised draft long-term management plan for the proposed Cordelia Slough Preserve habitat compensation site (Wildlands 2014).
- July 2, 2014: The Service attended a meeting with WRA and ART.
- November 25, 2014: The Service received from WRA responses to the Service's comments on the acoustics study report (B. Clarke, WRA, *in litt.* 2014b).
- February 6, 2015: The Service approved the final long-term management plan for the Cordelia Slough Preserve habitat compensation site (WRA 2015).
- February 17, 2016: The Service received from WRA the acoustic monitoring proposal for monitoring the effects of noise from proposed project construction on California clapper rails in the nearby tidal marshes (M. Osowski, WRA, *in litt.* 2016b).
- July 7, 2016: The Service received from WRA the proposed noise minimization measures for the California clapper rail.
- August 26, 2016: The Service received from WRA and the Corps the revised final project description for the proposed project (M. Osowski, WRA, *in litt.* 2016a).
- September 7, 2016: The Service requested from the Corps whether the conservation measures and effects analysis in the biological assessment (WRA 2012, 2013) were still applicable to the revised final project description.
- January 16, 2017: The Service received from WRA the revised Biological Assessment (WRA 2017a).
- January 25, 2017: The Service sent via electronic mail to the Corps, WRA, and ART a request for measures that would be implemented to avoid disturbing breeding California clapper rails and noting that the initially proposed

- noise minimization measures were not included in the revised Biological Assessment.
- February 8, 2017: The Service received from WRA a letter disagreeing with the Service's response that breeding California clapper rails could be disturbed by noise associated with construction of the proposed project.
- April 10, 2017: The Service participated in a conference call with WRA and the Corps to discuss the potential for the proposed project to disturb breeding California clapper rails and measures to minimize the effects.
- May 15, 2017: The Service received the memorandum from WRA summarizing their conclusion that construction work during the breeding season would not disturb breeding California clapper rails.
- May 31, 2017: The Service participated in a conference call with WRA, Tesoro, ART, and the Corps regarding the potential for proposed breeding season construction work to disturb breeding California clapper rails. The Service summarized their position that a breeding pair of California clapper rails may be harassed due to elevated construction noise during the six-year construction period due to the known occurrence of a California clapper rail within less than 500 feet of the proposed work area within the past nine years. The Service stated that if ART cannot agree to avoid construction within 700 feet of California clapper rails during the rail's breeding season, then ART should compensate by funding the restoration and/or preservation of a breeding territory for the California clapper rail at a Service-approved location.
- June 8, 2017: The Service received from WRA the California clapper rail protocol-level survey results for the 2017 breeding season (WRA 2017b).
- June 29, 2017: The Service received from Johnson Marigot Consulting, LLC a memorandum summarizing the benefits of the proposed remediation work on the California clapper rail (C. Johnson, Johnson Marigot Consulting, LLC, *in litt.* 2017).
- July 5, 2017: The Service participated in a conference call with WRA, Tesoro, ART, Johnson Marigot Consulting, LLC, Morgan, Lewis & Bockius, LLP and the Corps to discuss the memorandum from Johnson Marigot Consulting, LLC (C. Johnson, Johnson Marigot Consulting, LLC, *in litt.* 2017). WRA, Tesoro, ART, and Johnson Marigot Consulting, LLC, agreed to contact the San Pablo Bay National Wildlife Refuge to discuss options for habitat compensation for the California clapper rail by funding habitat restoration at the San Pablo Bay National Wildlife Refuge.
- August 10, 2017: The Service received a letter from Morgan, Lewis & Bockius, LLP describing ART's proposal to fund the restoration of 5.5 acres of tidal marsh habitat for the California clapper rail through channel excavation and creation of marsh mounds in the Sonoma Creek Marsh Enhancement

Project at the San Pablo Bay National Wildlife Refuge as offsite compensatory mitigation for the effects of the proposed project on the California clapper rail (E. Gannon, Morgan, Lewis & Bockius, LLP, *in litt.* 2017).

- August 14, 2017: The Service attended a meeting with staff from Tesoro, ART, Johnson Marigot Consulting, LLC, and Morgan, Lewis & Bockius, LLP, to discuss the August 10, 2017, letter from Morgan, Lewis & Bockius, LLP, and avoidance and minimization measures for the salt marsh harvest mouse and California clapper rail. ART agreed to contribute \$357,500 to the Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge as offsite compensatory mitigation for the effects of the proposed project on the California clapper rail. ART requested a draft biological opinion.
- August 16, 2017: The Service received a request for a draft biological opinion from the Corps.
- September 29, 2017: The Service sent the draft biological opinion to the Corps.
- November 14, 2017: The Service received comments on the draft biological opinion from the Corps.

BIOLOGICAL OPINION

Description of the Proposed Action

The proposed project includes field investigation and field design studies for closure of the WMUs 10/11/14, 31, and 32 at the Refinery, WMU closure construction, and post-closure monitoring and maintenance in the action area. The map of the proposed project area is shown in Figure 1 below.

WMUs Closure Summary

WMUs 10/11/14 – Consolidation of Wastes and Capping at WMU 14 under a Title 27 Prescriptive Cover

Closure at WMUs 10/11/14 involves consolidating the waste material from WMUs 10 and 11 (approximately 83,000 cubic yards) into WMU 14. WMUs 10 and 11 will subsequently be considered clean closed by the removal of wastes to the limit of visible impacts down into the top of the underlying coke fill layer. The excavated waste deposited into WMU 14 (along with select wastes from other WMU closures) will then be covered with a prescriptive Title 27 multi-layer soil cap, which is likely to include a geomembrane. Prior to placement into WMU 14, the excavated waste materials will be stabilized with additional soil or cement to improve their handling and compaction characteristics. The perimeter berms at WMU 14 will be improved to support the consolidated waste material and cap for stability and settlement. The excavations resulting from the waste consolidation will be backfilled with clean soil and revegetated to restore the impacted sensitive habitat in accordance with a habitat mitigation and monitoring

plan (HMMP). The erosion-resistant surface of the WMU 14 cap will be un-vegetated (*i.e.*, covered with gravel and rock).

WMU 31 – Clean Closure and Relocation of Wastes to WMU 14

Waste at WMU 31 will be excavated down to the limits of visible impacts in the underlying and adjacent soil (approximately 111,000 cubic yards of waste) and relocated to WMU 14 for final capping. WMU 31 will then be considered clean closed. The waste excavations will be backfilled

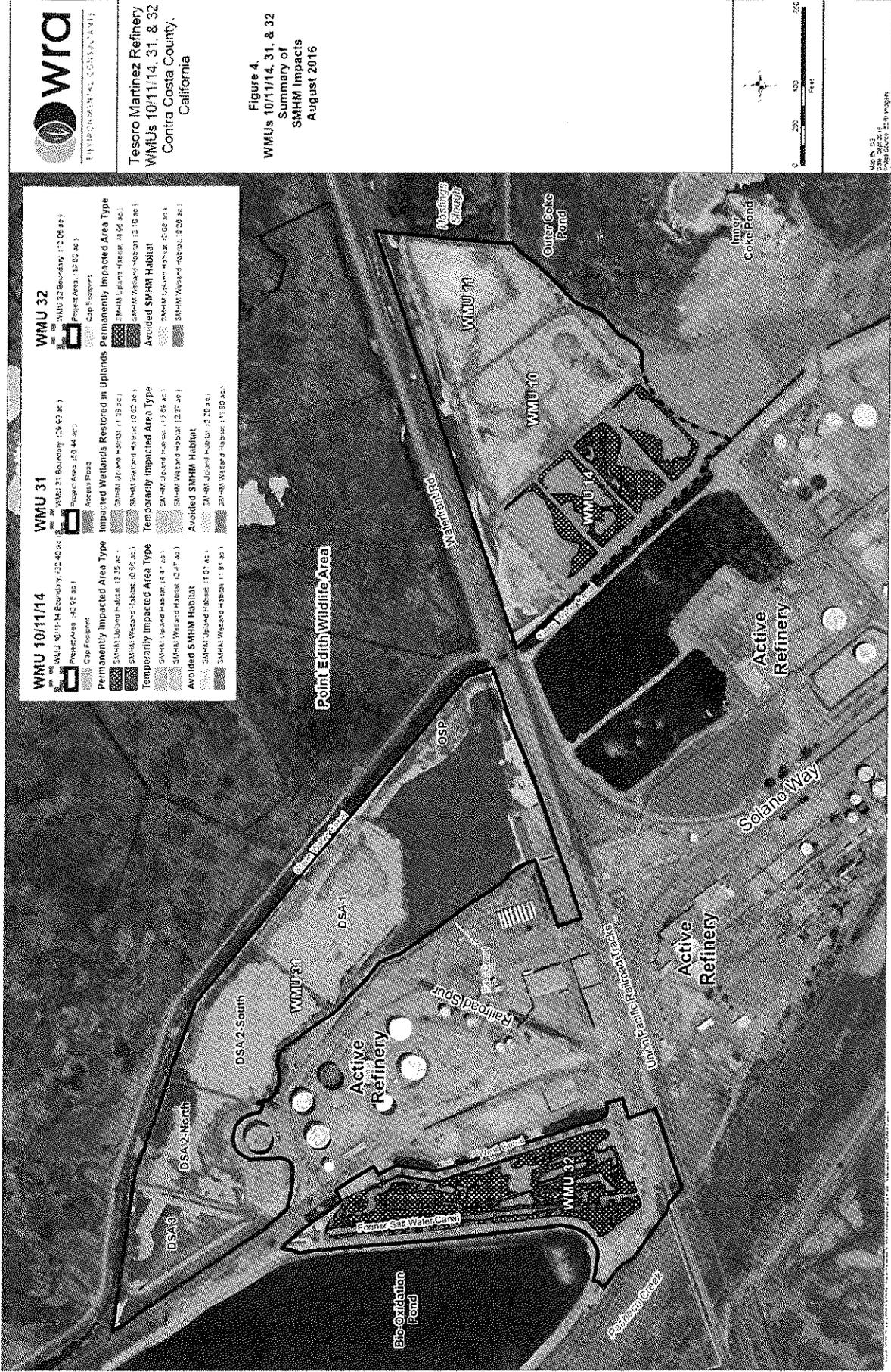


Figure 1. The action area and proposed project features (copied from Figure 4 in WRA 2017a).

with clean soil to approximately pre-excavation grades and re-vegetated. Wetlands and upland habitat at WMU 31 impacted by excavation activities will be restored after construction.

WMU 32 – Engineered Alternative Low-Permeability Cover

The WMU footprint will be covered with a Title 27 Compliant cap and cover which is likely to include a geomembrane.

Construction Process

Field Investigations and Field Design Studies

Field investigations to further refine the nature and extent of waste, and surface and subsurface conditions at the action area will be conducted. The field investigations may include sampled soil borings, test pits, and installation and sampling of groundwater monitoring wells or similar devices. These investigations may involve the use of hand-operated power tools, truck-mounted drill rigs, backhoes, and support vehicles. These investigations will also involve the construction of temporary vehicular and personnel access ways, such as crane mats and marsh mats, and corridors through vegetated areas.

Field-scale engineering design studies will be conducted within the action area. Such studies may include small-scale excavations, test fill placements, and pilot-scale waste stabilization and geotechnical constructions (*e.g.*, test soil/cement column installations). These field design studies may involve the use of hand-operated power tools, truck-mounted drill rigs, a variety of earth moving vehicles (such as excavators), other heavy construction equipment, and support vehicles. These activities will also involve the construction of temporary vehicular and personnel access ways such as earthen roads, crane mats, marsh mats, and corridors through vegetated areas. The design studies may result in constructed features, such as ground improvement soil-cement columns, that will be incorporated into the later closure construction.

Site Preparation

Prior to excavation activities in the WMUs, the excavation areas will be grubbed to remove rocks, vegetation, and debris. Monitoring wells located within the work zone will be destroyed in accordance with Contra Costa County well destruction requirements. Utilities will be relocated where necessary. The existing storm water control pipes along the interior berms of WMU 10/11/14 will be removed. Overhead power lines in WMUs 31 and 32 may be relocated if necessary. Best management practices (BMPs) will be implemented to minimize erosion and sedimentation. Possible BMPs include, but are not limited to, silt fencing, straw wattles, and watering. Access to the action area will be controlled with temporary fencing or similar methods.

Access Roads

Temporary access roads will be constructed to allow construction equipment to approach excavation operations and other on-WMU work zones. Some of the access roads will be incorporated into the WMU closure design for permanent post-closure access as well. WMU 14 perimeter berms will be improved and surfaced with gravel for the purposes described above. At least one permanent access road will be constructed at WMU 31. The access road will likely be

located west of the Clean Water Canal. At a minimum, significant soil improvement using geosynthetic reinforcement and/or soil stabilizing ground improvement and shoring will be required to support construction traffic.

Excavation and Relocation/Consolidation of Wastes

The WMU 31 Oily Skim Pond will be excavated during the construction of the adjacent access road. Sheet pile shoring may be utilized at the Oily Skim Pond to protect the open excavation and adjacent equipment areas. Following waste excavation of the Oily Skim Pond and the south end of Dredged Sediment Area 1, excavation will proceed in the Dredged Sediment Areas.

WMU 31 excavation and backfill operations in the Dredged Sediment Areas will generally proceed from the north to the south. Where conditions warrant, geosynthetic fabric may be placed prior to backfilling to provide support for the import backfill soils. Temporary sheet piling may be used for excavation shoring. As excavation progresses, backfill will be placed to pre-excavation grades, thereby facilitating re-establishment of the temporarily impacted wetlands and habitat. Excavation will be conducted in phases in discrete areas to reduce the overall temporal disturbance of temporary impacts.

Because the waste material tends to be very soft and much of it is located below the groundwater table, the excavated material from WMUs 10, 11, 31, and 32 will need to be stabilized prior to further handling by removal of liquid or by the addition of a reinforcing material (e.g., soil or cement). The waste material from the Oily Skim Pond will either be similarly processed before transport to WMU 14 for final capping or sent to the Refinery coker unit for recycling. Measures such as misters and foam application may be used for odor control during waste excavation and stabilizing work in the WMUs.

Soil Cap Construction

WMU 14 Cap

In situ soil-cement mixing to control the stability and settlement of the subsequent consolidated waste and final cap will be performed underneath the perimeter berms of WMU 14 to an average depth of approximately 20 feet. The perimeter berms will be raised to approximately 20 feet above mean sea level for the cap construction and surfaced with aggregate base for erosion control and for post-closure access. The cap will be placed above the consolidated waste material. The cap will consist of a Title 27 compliant cap and cover including a geomembrane. The final cover will be constructed at an elevation of approximately 40 feet above mean sea level.

WMU 32 Cap

The soil cap construction at WMU 32 will consist of a Title 27 compliant cap and cover including a geomembrane potentially extending beyond the southwest perimeter of the WMU.

Restoration of Temporarily Affected Areas

Excavated areas that lie outside of the caps will be backfilled and graded for surface water drainage or will be used to re-create wetlands impacted by excavation activities. Non-wetland areas will be restored through seeding and planting native upland grasses and shrubs. Temporarily impacted wetlands will be restored through planting native brackish seasonal wetland plant species. A separate HMMP that details re-vegetation activities and monitoring at each location will be submitted to the Corps, the Service, and SFRWQCB.

Post Closure Monitoring and Maintenance

Groundwater Monitoring

Monitoring of the closed WMUs will include the installation and periodic sampling of groundwater monitoring wells. Installation, maintenance, sampling, and repair of groundwater monitoring wells will be performed from permanent access roadways and developed access areas.

Closed Unit Inspection, Maintenance, and Repair

The caps of the closed WMUs will be regularly inspected, maintained, and repaired/upgraded in accordance with SFRWQCB-approved Closure and Post-Closure Maintenance Plans. Inspections will take place from permanent roadways and access areas where caps and/or land covers have been constructed. Anticipated maintenance and repair activities will include keeping erosion control surfaces and surface water drainage ways clear and in good condition, repairs to signage, gates, and fences, monitoring device repair, and removal of invasive plant species. Minor repairs to the structures mentioned above will require the use of hand and power tools. Major repairs may be performed in the event of erosion or damage to the cap under Title 27 and SFRWQCB Waste Discharge Requirements; major repairs may necessitate the use of heavy equipment. Upgrades to berm heights, armor layers, and access roads may result from adaptive management responses to sea level rise. Areas of inspection, maintenance, and repair will be accessed using developed areas such as roads, as described above.

Restoration Maintenance

Restoration maintenance will include non-native plant management, irrigation system use, and additional planting of native vegetation as necessary. Maintenance of the restoration area will be conducted using hand tools and aquatic-safe herbicides. Monitoring and maintenance of restored wetlands and habitat will be conducted under the terms and conditions outlined in the forthcoming HMMP for the duration of the prescribed monitoring period.

Equipment

Standard construction equipment will be used in the closure actions described above, as well as preceding field design studies. Field investigation activities may use excavators, front end loaders, hand-operated power equipment, truck-mounted drilling equipment, and support trucks. Marsh mats, crane mats, and similar devices will provide temporary access to investigation design study areas.

Sheet piles, required to support access roads in WMU 31 and in some excavation areas, will be driven by impact or vibratory hammers mounted on a crane or other mobile heavy equipment. Hydraulic press equipment may also be appropriate for sheet pile installation. Ground improvement may require specialized drilling equipment for soil mixing. Ground improvement materials, such as cement and water, will require mixing equipment and associated staging areas and/or structures.

Excavation and backfilling will be performed with excavators, bulldozers, and graders, with earth moved by front end loaders and dump trucks. Construction of the cover systems may use the aforementioned equipment in addition to other fine-grading and compaction equipment. Areas of restored habitat will use grading equipment. Vacuum trucks, pumps, holding tanks, and similar equipment will support excavation and waste removal activities. Water trucks will be used to suppress dust.

Maintenance and minor repairs to caps will require hand-operated power tool use and relatively light construction equipment (*e.g.*, backhoes and light truck access). Heavy equipment, such as drill rigs and development rigs, will be used to install groundwater monitoring devices.

Non-native invasive plant species removal on caps and/or land cover and restored areas will require power tool use (*e.g.*, mowers and string trimmers), hand tool use, and the use of herbicides.

Construction Duration

All activities described above could occur at any time throughout the calendar year. Work will be mainly performed during daylight hours, although work lighting may be used to extend the length of work days, if necessitated by the activity, the project schedule, or for worker safety. Project construction activities will begin upon receipt of various regulatory permits. Closure activities in the action area near the WMUs will proceed as efficiently and expeditiously as possible, but will likely continue for one to six years depending on location.

Based on the closure concepts described herein, estimates of each WMU's project duration to completion are as follows: WMU 10/11 one year, WMU 14 six years, WMU 31 three years, and WMU 32 one year. Some construction activities will be conducted concurrently, but the construction duration is expected to last approximately six years (2019-2025). Additionally, as described above in the section *Excavation and Relocation/Consolidation of Wastes*, waste removal from WMU 31 will be conducted in phases, where discrete areas are disturbed, excavated, backfilled to pre-excavation grades, and revegetated in less than 24 months. Thus wetlands and upland habitat will be restored similar to pre-disturbance conditions.

Inspection and maintenance of the closed WMUs will continue as required by the SFRWQCB-approved closure plans, assumed to be for an indefinite period of time. Monitoring and potential maintenance of restored habitat will be for the duration of the prescribed monitoring period approved by reviewing agencies in the forthcoming HMMP. No effects from the post-closure monitoring and maintenance activities are anticipated.

Conservation Measures

ART and its contractors will implement the following measures to avoid or minimize potential adverse direct and indirect effects to the salt marsh harvest mouse, California clapper rail, and their habitats within the action area.

1. Construction personnel will receive Service-approved worker environmental awareness training from a Service-approved biologist. The training will include a description of the salt marsh harvest mouse and California clapper rail, including natural history and habitat, a review of these species listings, general protection measures to be implemented to protect these species, and a delineation of the limits of the work areas.
2. Prior to the commencement of construction, the following measures will be conducted in an effort to ensure no salt marsh harvest mice are present in any work area. Prior to removal of vegetation, the Service-approved biologist will walk the work zone to ensure no salt marsh harvest mice or their nests occur within the work zone. In potential salt marsh harvest mouse habitat areas, vegetation will be removed using a two-step process by which vegetation will be removed to bare ground in a manner to enable and encourage salt marsh harvest mice to move out and away from the construction area. Tall vegetation will first be removed using a walk behind mower with the blade set at a high ground clearance to avoid direct mortality to the salt marsh harvest mouse. This will allow subsequent removal of vegetation to the ground surface using string trimmers under the supervision of a Service-approved biological monitor since visibility of the ground surface will be possible given the short stature of the vegetation.
3. Once vegetation removal is complete, temporary exclusion fencing will be placed around a defined work area prior to the start of construction activities preventing salt marsh harvest mice from moving into construction areas. The fence will be made of a material that does not allow salt marsh harvest mice to pass through or climb over, and the bottom will be buried to a depth of at least 6 inches so salt marsh harvest mice cannot crawl under the fence. All supports for the exclusion fencing will be placed on the inside of the work area. The fences will be inspected daily for holes and gaps, which will be repaired as soon as detected.
4. A Service-approved biologist(s) will be present during installation of exclusion fence, removal of the exclusion fence, vegetation removal, and as needed to conduct environmental awareness training for all construction personnel. The biologist(s) will also be the contact person(s) for any employee or contractor if a salt marsh harvest mouse is encountered on the job.
5. If a salt marsh harvest mouse is encountered during construction, activities within 100 feet of the mouse will cease until the mouse leaves the work area of its own volition, and it has been determined by the biologist that the mouse will not be harmed. If the mouse does not move, the Service-approved biologist will contact the Service for guidance.
6. All food and food-related trash items will be enclosed in sealed trash containers and removed completely from the site at the end of each day.

7. No nighttime work is planned; however, if nighttime work is necessary the applicant will direct the lighting away from potential habitat outside the exclusion fence and use lighting that minimizes backward and side lighting.
8. ART will compensate for the temporary disturbance of 24.64 acres and the permanent loss of 11.27 acres of salt marsh harvest mouse habitat by preserving and managing in perpetuity a total of 83.09 acres of suitable habitat for the salt marsh harvest mouse at Wildlands' Cordelia Slough Preserve in Suisun Bay in Solano County, California, under a Service-approved long-term management plan with a fully funded endowment (Wildlands 2015). The amount of habitat compensation is based on a ratio of 2:1 for temporary impacts (less than 24 months in duration) and a 3:1 ratio for permanent impacts (longer than 24 months in duration).
9. The potential for the contamination and degradation of suitable habitat for the salt marsh harvest mouse will be minimized by implementing water quality BMPs, a Storm Water Pollution Prevention Plan, emergency spill containment and contingency plan, and weed management.
10. All temporarily disturbed habitats within the action area will be restored under a Service-approved HMMP with success criteria and invasive plant species control.
11. ART will fund \$357,500 for the restoration of at least 5.5 acres of tidal marsh/high tide refuge habitat for the California clapper rail through channel excavation and creation of marsh mounds in the Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge in Sonoma County, California (Wetlands and Water Resources, Inc. 2009; San Pablo Bay National Wildlife Refuge 2014; Service file number 81420-2011-F-0774-2, Service 2014). ART will provide the funding prior to the initiation of construction of the proposed project.

Action Area

The action area is defined in 50 CFR § 402.02, as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action." For the proposed project, the action area encompasses approximately 110 acres, including approximately: 32 acres for WMUs 10/11/14; 8 acres of operational/access areas for WMUs 10/11/14; 30 acres for WMU 31; 20 acres of operational/access areas for WMU 31; 12 acres for WMU 32; and 7 acres of operational/access areas for WMU 32. In addition, the action area includes all suitable tidal marsh breeding habitat for the California clapper rail at the Point Edith Wildlife Area within 700 feet of the proposed project footprint where noise levels will be elevated above ambient conditions due to proposed project construction during the breeding season. The action area also includes the 83.09 acres of salt marsh harvest mouse habitat that will be preserved at Wildlands' Cordelia Slough Preserve in Suisun Bay in Solano County, California. The action area also includes the 5.5 acres of tidal marsh/high tide refuge habitat that will be restored in Sonoma Creek Marsh at the San Pablo Bay National Wildlife Refuge in Sonoma County, California. In summary the action area encompasses 198.59 acres including the proposed project and compensatory mitigation areas.

Analytical Framework for the Jeopardy Determination

Section 7(a)(2) of the Endangered Species Act requires that Federal agencies ensure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. "Jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR § 402.02).

The jeopardy analysis in this biological opinion considers the effects of the proposed Federal action, and any cumulative effects, on the rangewide survival and recovery of the listed species. It relies on four components: (1) the *Status of the Species*, which describes the rangewide condition of the species, the factors responsible for that condition, and its survival and recovery needs; (2) the *Environmental Baseline*, which analyzes the condition of the species in the action area, the factors responsible for that condition, and the relationship of the action area to the survival and recovery of the species; (3) the *Effects of the Action*, which determines the direct and indirect impacts of the proposed Federal action and the effects of any interrelated or interdependent activities on the species; and (4) the *Cumulative Effects*, which evaluates the effects of future, non-Federal activities in the action area on the species.

Status of the Species

Salt Marsh Harvest Mouse

There are two subspecies of the salt marsh harvest mouse: the northern subspecies (*R. r. halicoetes*) and the southern subspecies (*R. r. raviventris*). Both subspecies are listed as endangered. For the most recent comprehensive assessment of the species' range-wide status, please refer to the *Recovery Plan for Tidal Marsh Ecosystems of Northern and Central California* (Recovery Plan; http://ecos.fws.gov/docs/recovery_plan/TMRP_Final.pdf; Service 2013a). No change in the species' listing status was recommended in the February 2010 5-year review for the salt marsh harvest mouse (Service 2010). Threats evaluated during that review and discussed in the final document and the Recovery Plan have continued to act on the species since the February 2010 5-year review and the August 2013 Recovery Plan were finalized, with the loss, degradation, and fragmentation of habitat being the most significant effect. While there have been continued losses of salt marsh harvest mouse habitat throughout the various recovery units, including the Suisun Bay Area unit where the proposed project is located, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

California Clapper Rail

For the most recent comprehensive assessment of the species' range-wide status, please refer to the Recovery Plan (http://ecos.fws.gov/docs/recovery_plan/TMRP_Final.pdf; Service 2013a). No change in the species' listing status was recommended in the April 2013 5-year review for the California clapper rail (Service 2013c). Threats evaluated during that review and discussed in the final document and the Recovery Plan have continued to act on the species since the April 2013 5-year review and the August 2013 Recovery Plan were finalized, with predation and the loss, degradation, and fragmentation of habitat being the most significant effect. While there

have been continued losses of California clapper rail habitat throughout the various recovery units, including the Suisun Bay Area unit where the proposed project is located, to date no project has proposed a level of effects for which the Service has issued a biological opinion of jeopardy for the species.

Environmental Baseline

Historical Use of the WMUs

The Refinery originally refined crude oil from the San Joaquin Valley into gasoline, kerosene, and fuel oil. Lubricating oils, grease, solvents, and transformer oils have also been produced during the life of the Refinery. Presently, the Refinery is the second-largest refinery in Northern California with a crude oil capacity of 166,000 barrels per day. The Refinery produces motor fuels, heavy fuel oils, and liquefied petroleum gas from crude oils from Alaskan, Californian, and foreign sources.

WMUs 10 and 11 are inactive waste management units. They were constructed in approximately 1966. These treatment units received oily wastes and petroleum sludge from various Refinery facilities. Waste placement in WMUs 10 and 11 ceased in approximately 1976. Land farming operations occurred on WMUs 10 and 11 from the late 1970s until 1991 (a bioremediation treatment process that is performed in the upper soil zone or in biotreatment cells; contaminated soils, sediments or sludges are incorporated into the soil surface and periodically turned over or tilled to aerate the mixture). Thereafter, biological treatment of the wastes was allowed to continue in a passive mode.

WMU 14 is an inactive waste management unit constructed over the western portion of WMU 10 in 1976. WMU 14 is made up of four sludge-drying beds that received sludge from biologically treated Refinery wastewater until approximately 1988. Ongoing maintenance activities that occur in WMUs 10/11/14 consist of application of rolled erosion control blanket to prevent surface erosion in an effort to prevent exposure to waste material and maintenance of WMU berms, when necessary.

WMU 31 is an inactive waste management unit that was previously diked and used for disposal of dredge spoils and oily wastes as early as the 1920s. WMU 31 is subdivided by constructed berms into four distinct topographic basins. The northern three basins likely received dredge spoils from Pacheco Creek, the Clean Water Canal, and excavated materials from the construction of the Bio- Oxidation Pond. These areas were also reportedly used for disposal of oily wastes and leaded gasoline as early as the 1920s. The southernmost basin contains surface expressions of hydrocarbon waste material, which is overlain by a thin layer of soil or biotic crust. This basin may have received oil skim from the Refinery canals and oil/water separator solids from a former above-ground storage tank. According to historic aerial photos, the southern portion of WMU 31 may have received material from the dredging of Refinery canals. WMU 32 and the surrounding area contained north- and south-trending drainage canals at one time which may have received solid and liquid waste. The drainage canals may have been part of an early wastewater system utilized during the 1950s and 1960s. Fill material, possibly from the West Canal, were placed adjacent to the West Canal on the eastern edge of WMU 32. The drainages and canals were filled in during the 1970s and 1980s.

Contaminants in the WMUs

The WMUs currently include contamination that the State and Federal agencies with jurisdiction over the project site have determined needs to be remediated. The California Regional Water Quality Control Board Order No. R2-2004-0056 includes the following descriptions of the WMUs that are proposed for clean-up:

WMU 10 Oily Sludge Land Farm

WMU 10 is an unlined inactive, 10.4-acre land-farm made up of two cells that operated from 1966-1976. The land treatment unit received approximately 10,600 cubic yards of oily wastes, and waste from the American Petroleum Institute separator and dissolved air flotation units. The unit is located in the 100-year flood plain, and is protected from flooding by 3 to 4-foot high dikes constructed around the perimeter. Depth to groundwater beneath the unit ranges from 1 to 7 feet below ground surface. The unit's waste contains petroleum hydrocarbons, metals (*i.e.*, lead and chromium), tetraethyl lead, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, arsenic, and petroleum hydrocarbons. During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact and the pumping of ponded water from the unit. The unit does not have a soil cover, and therefore, contains exposed waste.

WMU 11 Oily Sludge Land Farm

WMU 11 is an unlined and inactive 7.2-acre land farm with a period of disposal from 1966-1976. The land treatment unit received oily wastes, petroleum sludges, and waste from the American Petroleum Institute separator and dissolved air flotation units. This unit is located in the 100-year flood plain, and is protected from flooding by the dikes constructed around the perimeter. The unit's waste contains petroleum hydrocarbons, metals (*i.e.*, lead and chromium), tetraethyl lead, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, arsenic, and petroleum hydrocarbons. During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact. In addition, ponded water is pumped from the unit to the Refinery's water treatment plant. The unit does not have a cover, and therefore contains exposed waste.

WMU 14 Oily Sludge Land Farm

WMU 14 is an unlined inactive, 9.1-acre pond system that was constructed over the western portion of WMU 10 in 1976. The unit is made up of four sludge-drying beds that received sludge until the late 1970's from biologically treated refinery wastewater. This unit is located in the 100-year flood plain, and is protected from flooding by 2 to 5 foot high dikes constructed around the perimeter of the unit. However, during the wet season the unit may contain ponded water. The unit's waste contains petroleum hydrocarbons, metals (*i.e.*, lead, selenium, and chromium), tetraethyl lead, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, lead, chromium, hexavalent chromium, and petroleum hydrocarbons. During the wet season, ponded water can be found on the unit. Interim measures to mitigate this condition include the application of a fiber-bonded matrix to minimize dust and physical contact

and the pumping of ponded water from the unit. The unit does not have a cover, and therefore contains exposed waste.

WMU 31 Oil Sludge Landfill

WMU 31 is an approximately 21-acre unlined and inactive landfill, with a period of disposal from the 1950s to 1960s. A tetraethyl lead blending facility was located on the west side of the unit, and may have impacted the unit. Adjacent to the site is a former drum storage area and oil skim ponds. The unit received oily wastes and dredge spoils from the former Oily Water Canal. This unit is underlain by up to 6.5 feet of oily sludge and is partially underlain by free-phase petroleum hydrocarbons. During wet weather, portions of the unit may pond. The unit's waste contains petroleum hydrocarbons, metals (*i.e.*, lead), tetraethyl lead, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected lead, chromium, zinc, and petroleum hydrocarbons. The site currently contains former ponds, pits, and an open tank with petroleum waste. Other waste in the form of glass and rubbish is evident. The unit does not have a cover, and therefore, in general, contains exposed waste.

WMU 32

WMU 32 is a 10.7-acre area located adjacent to WMU 16. There are impacts to the area that indicate that releases have occurred. A drum reconditioning facility was located 700 feet east of the unit where historical aerial photographs reveal stockpiles containing thousands of drums. The unit's area at one time contained north and south trending drainage canals, which may have received oily and contaminated water. The unit is partially underlain by free-phase petroleum hydrocarbons, which likely emanates from the Tract 3 tank farm. The unit has recently been the subject of further investigation and interim corrective measures to mitigate low pH conditions. The unit's waste contains petroleum hydrocarbons, metals (*i.e.*, lead), tetraethyl lead, low pH soil, and various organic compounds. Groundwater monitoring in the vicinity of the unit has detected arsenic, nickel, chromium, zinc, benzene, and other petroleum hydrocarbons. Low pH has also been reported in groundwater beneath the unit.

Tesoro WMUs 10/11/14, 31, and 32 Closure Project Area

Land uses in areas surrounding the action area include a mix of open space and various public and private uses including heavy industry, railways, residential (Cities of Clyde and Concord), commercial, Pacheco Slough to the west, and brackish marshes that connect to Hastings Slough to the north and at the Point Edith Wildlife Area adjacent to Suisun Bay (Figure 1). Other land uses in the vicinity include refineries and waste disposal, including the former IT Corporation Baker Facility, the ACME Fill Corporation Landfill, and the former Vine Hill Complex hazardous waste disposal facility. The habitats within the action area are summarized below.

Disturbed/Developed/Bare Areas

Developed roads and levees occur throughout the action area. These roads are lightly trafficked and are unsealed gravel or dirt surfaced. Bare areas devoid of vegetation occur in the basin bottoms and are scattered throughout portions of the action area. Berms and levees separate former treatment cells and are present in WMUs 10/11/14 and 31. These are steep-sided (greater than 20 percent slope), generally 3 to 5-feet tall and support ruderal grassland habitat. The roads,

levees and bare areas within the action area near WMUs 10/11/14, 31, and 32 provide pathways for potential predators of the salt marsh harvest mouse. Salt marsh harvest mice generally avoid developed areas devoid of vegetation. Salt marsh harvest mice, however, may forage and disperse through the ruderal grassland areas along the levees within the action area.

Disturbed Brackish Seasonal Wetland

A disturbed brackish seasonal wetland is present in the action area, including WMU interiors. The WMU interiors support vegetation typically found in these types of wetlands. Disturbed, brackish seasonal wetland communities occur in swales and depressions that become ponded or saturated during the rainy season for sufficient duration to support vegetation adapted to wetland conditions. In addition, some of the seasonal wetlands located along the northern boundary of the WMUs 10/11/14 action area appear to be subjected to tidal inundation during extreme high tide events. Disturbed brackish seasonal wetlands are located in depressions, with their boundaries delineated by changes in vegetation and by berms. Some of the brackish seasonal wetlands exhibited surface hydrology indicators such as salt crusts, biotic crusts, and sediment deposits, while others were indicated as having wetland hydrology by the presence of oxidized rhizospheres.

Dominant plant species in these wetlands include pickleweed, saltgrass, sparscale, and rabbitsfoot grass. Species interspersed with the saltgrass north of WMUs 10/11/14, north and south areas of the action area near WMU 31, and in the southwest section of WMU 32 include pickleweed, non-native Mediterranean barley, and the native saltmarsh sand spurry. Several patches of bulrush and Baltic rush are located in channels and depressions in the action area near WMUs 31 and 32. Smaller seasonal wetland areas generally support a higher cover of exotic invasive species; these areas are dominated by saltgrass, Italian ryegrass, perennial pepperweed, common sow thistle, and, in some cases, poverty weed.

Disturbed brackish seasonal wetlands north of WMUs 10/11/14 receive tidal input during extreme high tides. Due to the local hydrology, the waters cannot retreat during low tides. Within the action area near WMUs 10/11/14 and 32, disturbed brackish seasonal wetlands are small, discontinuous, and the vegetation is generally short and patchy. Within the action area near WMU 31, disturbed seasonal brackish wetlands are larger and more densely vegetated than in the action area near WMUs 10/11/14 and 32. Salt marsh harvest mice may forage and disperse through the disturbed seasonal brackish wetlands throughout the action area. Disturbed seasonal brackish wetlands with a higher density of pickleweed cover within the action area may also support breeding salt marsh harvest mice.

Disturbed Seasonal Wetland

Disturbed seasonal wetlands are present in the action area near WMU 10/11/14, including WMU interiors. The WMU interiors support vegetation typically found in these types of wetlands. Disturbed seasonal wetlands are present in the action area near WMUs 10/11/14 and are absent from the action area near WMUs 31 and 32. WMUs 10/11/14 are comprised of a series of bermed treatment cells historically used to treat and contain refinement waste. The basin bottoms of these cells have been layered with a geo-textile mat, are inundated for portions of the wet season, and support marginal hydrophytic vegetation. Some areas are devoid of vegetation. Pumping of ponded surface water occurs during the rainy season at WMUs 10/11/14 when

inundation occurs. Soils are mainly comprised of fill and degraded soil substrate. Seasonal wetland plant communities occur in swales and depressions that are ponded during the rainy season for sufficient duration to support vegetation adapted to wetland conditions. Seasonal wetlands in the action area are located in the basin bottoms. Typical plant species observed in seasonal wetlands in the action area include Italian ryegrass and rabbitsfoot grass. Based on the disturbed nature of the soils, short, unpredictable periods of inundation (multiple cycles of wetting and drying each year), sparse vegetation, and lack of hydrologic connectivity with other wetlands, the disturbed seasonal wetlands within the action area are considered poor quality habitat for the salt marsh harvest mouse. Salt marsh harvest mice may forage and disperse through the disturbed seasonal wetlands throughout the action area.

Disturbed Brackish Seasonal Marsh

Disturbed brackish seasonal marsh is present in the action area near WMU 32, including the WMU 32 interior. One section of disturbed brackish seasonal marsh dominated by cattail is present in the action area near WMU 32. This long, narrow marsh runs north/south up to the northern action area boundary. The cattail within this marsh ranges between 2 to 5 feet tall. There is a dense stand of spearscale at the northern end of this marsh. The disturbed brackish seasonal marsh in the northern portion of the action area near WMU 32 is relatively small and lacks depth or connectivity to surrounding wetlands. The vegetation within this area is shorter and less dense than in adjacent undisturbed marsh areas. Salt marsh harvest mice may forage and disperse through the disturbed brackish seasonal marsh throughout the action area.

Ruderal Grassland

Ruderal grassland is present in the action area including WMU interiors. Ruderal vegetation is comprised of ruderal grass and herbaceous species. The dominant species observed in this community type were annual exotic grasses including soft chess, ripgut brome, Mediterranean barley, and Italian ryegrass. Significant areas of native, halophytic saltgrass are also included in this community if they did not exhibit characteristics of wetland habitat. Exotic ruderal herbaceous species also common in these fields included yellow star thistle, perennial pepperweed, prickly lettuce, common sow thistle, fennel, and bull thistle, with some inclusions of coyote brush, iceplant, and date palm. Salt marsh harvest mice may forage and disperse through all ruderal grasslands within the action area that are contiguous with and within 328 feet of suitable brackish seasonal wetland and brackish marsh habitat (Service 2010).

Coyote Brush Scrub

Coyote brush scrub is present in the action area near WMU 31 and 32 interiors. The action area near WMU 31 has several dense patches of coyote brush scrub along the unit perimeter berms. The action area near WMU 10/11/14 and 32 contains sporadic patches or single plants along the berms or upland areas. In this community, the understory consists of ruderal or wetland species similar to the rest of the action area, with a dominant shrub layer of coyote brush. Scattered date palms are also present in this community near the berms. Dense patches of scrub habitat provide perching and potential nesting habitat for white-tailed kites, a known predator of the salt marsh harvest mouse. The scattered date palms within WMUs 31 and 32 provide potential roosting habitat for barn owls, a known predator of salt marsh harvest mice. Although barn owls were not observed within WMUs 31 or 32, they have been seen utilizing date palms in this fashion in

other portions of the Refinery. Although coyote brush scrub may support predators of the salt marsh harvest mice, salt marsh harvest mice may forage and disperse through the herbaceous understory of coyote brush scrub habitat.

Bare Areas (Non-wetland Waters)

Bare areas (non-wetland waters) are present in the action area near the WMUs. Bare areas in the action area support sparse emergent and aquatic vegetation and algae. Bare areas were mapped based on hydrology indicators and the presence of less than five percent vegetation. Bare depressions with salt or biotic crusts that did not appear to contain substantial waste near the soil surface (*i.e.*, possessed a soil matrix dominated by fill and/or native soils) were mapped as bare areas. These depressions did not contain surface water at the time of surveys. However, these features exhibited clear signs of ponding and drying cycles, such as salt and biotic crusts, and were surrounded by areas identified as wetlands. These habitats are ephemeral, and fed primarily through rainfall. Surface runoff from rain events travels across the high-salinity soils in the area, depositing salts to these low-lying ephemeral pools. Salt marsh harvest mice typically avoid areas devoid of vegetation; however, salt marsh harvest mice have been observed nesting and sheltering in the cracks in unvegetated salt panne habitat in Suisun Marsh.

Point Edith Wildlife Area

The Point Edith Wildlife Area is located outside of but adjacent to the proposed project footprint of WMUs 10/11/14 and 31 (Figure 1). The Point Edith Wildlife Area contains high quality tidal marsh habitat for the salt marsh harvest mouse and California clapper rail. The tidal marsh of the Point Edith Wildlife Area is separated from the grasslands and seasonal wetlands of WMUs 10/11/14 and 31 by levees and the Clean Water Canal. A railroad is located on a levee between the Point Edith Wildlife Area and WMUs 10/11/14. An acoustic study conducted for the proposed project shows average ambient noise levels (L_{eq}) along the levee adjacent to the tidal marsh of the Point Edith Wildlife Area ranging from 48 decibels to 58 decibels and maximum ambient noise levels (L_{max}) ranging from 57 decibels to 74 decibels (M. Carr, Extant Acoustical Consulting, LLC, *in litt.* 2014). The highest maximum ambient noise levels at the Point Edith Wildlife Area are near WMUs 10/11/14 and are associated with railroad traffic. Ambient noise levels are lower in the Point Edith Wildlife Area adjacent to WMU 31 because the railroad is further from the tidal marsh; ambient noise in the tidal marsh next to WMU 31 is dominated by Refinery operations.

Cordelia Slough Preserve

Wildlands' Cordelia Slough Preserve is located at the former Green Lodge Duck Club property about 8.0 miles north of the action area for the proposed project on the west side of the Suisun Marsh in southwestern Solano County, California, east of Interstate 680 at the end of Goodyear Road, approximately five miles south of the City of Fairfield. The Cordelia Slough Preserve is located in a rural area of Suisun Marsh where the primary land use is duck and hunting clubs. It is bordered by a levee and Cordelia Slough to the south and east, a levee to the north, and Union Pacific Railroad tracks to the east. The Cordelia Slough Preserve is managed marsh habitat that currently supports a mosaic of pickleweed. The site also has upland habitats on the levees and full tidal habitats in the slough along the outboard levee.

The vegetative cover varies from dense stands of pickleweed to dense cover of facultative wetland species such as creeping wild rye, fat hen, and alkali heath and limited stands of salt grass. Habitats within the Cordelia Slough Preserve include semi-permanent open water, pickleweed-dominated managed marsh, upland refugia, tidal marsh (along the outboard levee), transition zone/refugia, and levee/refugia (Wildlands 2015). The diked, managed salt marsh habitats and adjacent grasslands of the Cordelia Slough Preserve provide suitable habitat for the salt marsh harvest mouse. The diked salt marsh is not suitable habitat for California clapper rail since it is non-tidal. However, the tidal marshes and slough along the outboard levee of the Cordelia Slough Preserve may provide foraging and dispersal habitat for the California clapper rail.

Wildlands purchased in fee title from the Green Lodge Land Company the 195-acre property which contains the Cordelia Slough Preserve and developed a final long-term management plan for the site for the benefit of the salt marsh harvest mouse (Cordelia Slough Long-term Management Plan, Wildlands 2015). The Service approved the Final Cordelia Slough Preserve Long-term Management Plan in February 2015 (Wildlands 2015). The Cordelia Slough Preserve will provide a substantial area of protected salt marsh habitat in an area that lies between other existing conservation parcels within the Suisun Marsh. Wildlands will manage water levels across the entire 195-acre property (aside from the area currently occupied by the duck club facilities) for the benefit of salt marsh harvest mice at the Cordelia Slough Preserve. However, management activities as described in the Cordelia Slough Preserve Long-term Management Plan will only occur within the Preserve. Wildlands submitted the first annual monitoring report for the Cordelia Slough Preserve to the Service in January 2017 (Wildlands 2016).

Portions of the 195-acre Cordelia Slough Preserve property are being utilized as habitat compensation for effects to salt marsh harvest mouse from other projects in the Martinez area of Contra Costa County. For example, the preservation and management in perpetuity of a total of 7.737 acres of salt marsh harvest mouse habitat at the Cordelia Slough Preserve will compensate for the effects of the Tesoro Amorco Pipeline Support Repair and Pipeline Demolition Project, the Plains Products Terminals LLC's Line 191 Relocation Project, and ART's Monitoring Well Installations at the Refinery along Waterfront Road near the City of Martinez, Contra Costa County, California (Service file number 08ESMF00-2014-F-0108-R001, Service 2017). The preservation of an additional 13.5 acres of salt marsh harvest mouse habitat at the Cordelia Slough Preserve will compensate for the effects of the Contra Costa Water District's Shortcut Pipeline Improvement Project (Service file number 08ESMF00-2015-F-0008-R001, Service 2016).

Sonoma Creek Marsh Enhancement Project

The Sonoma Creek Marsh consists of about 402 acres of fringing tidal marsh habitat at the San Pablo Bay National Wildlife Refuge in Sonoma County, California, along the western bank of lower Sonoma Creek south of Highway 37 and east of Tubbs Island. The marsh impounds water over a 100-acre area within the southern part of the marsh for long periods following high tides and winter rains. Interior berms and historic mosquito ditches, combined with rapid marsh expansion over the last century, have likely contributed to the expansion of these impoundments. The impoundment of water leads to high mosquito production rates and reduced health of marsh vegetation resulting in a large pickleweed "die back" zone consisting of low growing dead or dying pickleweed. These conditions reduce habitat quality for a number of tidal marsh species,

especially those that primarily inhabit the pickleweed plain, such as salt marsh harvest mice and California clapper rails. However, both the salt marsh harvest mouse and California clapper rail have been observed within the northern part of Sonoma Creek Marsh downstream of the Highway 37 bridge outside of the pickleweed “die back” zone (San Francisco Estuary Institute, <http://www.sfei.org/content/salt-marsh-harvest-mouse-database-and-maps#sthash.WTXwQppi.dpbs>; CDFW 2017; Block 2010a; Block 2010b).

The San Pablo Bay National Wildlife Refuge is working with the Marin/Sonoma Mosquito and Vector Control District to develop long-term solutions to improving drainage to this area in an effort to reduce mosquito management efforts (e.g., treatment with pesticides). The San Pablo Bay National Wildlife Refuge and the Marin/Sonoma Mosquito and Vector Control District are proposing to enhance 265 acres of the Sonoma Creek tidal marsh by excavating channels to improve tidal circulation in the Sonoma Creek Marsh Enhancement Project (Wetlands and Water Resources, Inc. 2009; San Pablo Bay National Wildlife Refuge 2014; Service file number 81420-2011-F-0774-2, Service 2014). The Sonoma Creek Marsh Enhancement Project will also create high-tide refugia habitat for the salt marsh harvest mouse and California clapper rail. The first phase of the Sonoma Creek Marsh Enhancement Project was constructed in 2015. Tesoro contributed \$260,000 for the restoration of at 4 acres of California clapper rail habitat in the first phase of the Sonoma Creek Marsh Enhancement Project as compensatory habitat mitigation for the effects of the Tesoro Proposed Avon Marine Oil Terminal Engineering and Maintenance Standards Compliance Project (Service file number 08FBTD00-2014-F-0023-2, Service 2015).

Salt Marsh Harvest Mouse

Habitats and Occurrences near the Action Area for the Tesoro WMUs 10/11/14, 31, and 32 Closure Project

The California Natural Diversity Database (CNDDDB) reports the salt marsh harvest mouse as occurring adjacent to the action area in the tidal marsh of the Point Edith Wildlife Area across Waterfront Road from WMUs 10/11/14 and across the Clean Water Canal from WMU 31 (CNDDDB occurrence number 4, CDFW 2017). This area is identified by the CNDDDB as “Avon-Port Chicago Marsh” and includes the entire Point Edith Wildlife Area, where the species was first reported in 1971 and captured throughout the 1980s and 1990s. Salt marsh harvest mouse was last reported within the action area at the Point Edith Wildlife Area in September 1998 (CNDDDB occurrence number 4, CDFW 2017). No surveys have been conducted for the salt marsh harvest mouse near the action area since 1998. The CNDDDB also reports the salt marsh harvest mouse as occurring within tidal marsh habitat across the 285-foot-wide Pacheco Creek from WMU 32 about 450 feet west of the action area (CNDDDB occurrence number 62, CDFW 2017).

The San Francisco Estuary Institute reports the following survey data for salt marsh harvest mice within 600 feet of the action area (<http://www.sfei.org/content/salt-marsh-harvest-mouse-database-and-maps#sthash.WTXwQppi.dpbs>; San Francisco Estuary Institute, undated):

1. Twelve salt marsh harvest mice captured during 150 trapping nights in tidal marsh habitat in the Point Edith Wildlife Area about 600 feet east of WMU 31 (capture efficiency (CE) = 8.0; site 2; Schaub, CDFW, unpubl. data, 1971); and

2. Seven salt marsh harvest mouse captured during 697 trapping nights in diked marsh habitat within the action area immediately north of the Refinery at Tesoro WMU 31 (CE = 1.0; site number 252; H.T. Harvey and Associates, unpubl. data, 1997). However, this occurrence of the salt marsh harvest mouse at WMU 31 may have been reported in error. When an inquiry was made by WRA to Dr. Howard Shellhammer about the location, Dr. Shellhammer stated that he had never trapped salt marsh harvest mice within the Tosco (now Tesoro Golden Eagle) Refinery, and that the location information must have been reported incorrectly (H. Shellhammer, H.T. Harvey and Associates, pers. comm. 2009 cited in WRA 2014).

The brackish seasonal wetlands within the action area that contain pickleweed provide suitable breeding, foraging, and dispersal habitat for the salt marsh harvest mouse. The salt marsh harvest mouse may also forage and disperse through all ruderal grassland and seasonal wetland habitats that are contiguous with and within 328 feet of suitable brackish seasonal wetland habitat. On the basis of habitat assessment and the proximity of known records, the Service believes the salt marsh harvest mouse is likely to occur within all suitable brackish seasonal wetland habitat within the action area and all adjacent ruderal upland and seasonal wetland habitat within 328 feet of suitable brackish seasonal wetland habitat in WMUs 10/11/14, 31, and 32. Figure 1 shows the location of suitable salt marsh harvest mouse habitat within the action area.

Table 1 below summarizes the amount of suitable wetland and upland habitat for the salt marsh harvest mouse that occurs within the action area in each of the WMUs. Out of the 110-acre action area within the WMUs, about 53.07 acres (48 percent) is suitable habitat for the salt marsh harvest mouse (22.29 acres of wetland habitat and 30.78 acres of upland habitat). WMUs 10/11/14 contain about 13.91 acres of suitable salt marsh harvest mouse habitat (5.14 acres of wetland habitat and 8.77 acres of upland habitat). WMU 31 contains about 31.76 acres of suitable salt marsh harvest mouse habitat (14.79 acres of wetland habitat and 16.97 acres of upland habitat). WMU 32 contains about 7.40 acres of suitable salt marsh harvest mouse habitat (2.36 acres of wetland habitat and 5.04 acres of upland habitat).

Habitat within the action area is largely considered low quality due to the structure of vegetation present, the limited expanse of year-round vegetative cover, the seasonal nature of the vegetation communities within all of the WMUs, and the presence of contaminants. The WMUs are dominated by seasonal, non-native grassland communities which do not provide cover or sources of food year-round due to seasonal vegetation die-back, and there is no evidence in the available literature to suggest that these areas are used by salt marsh harvest mouse as more than opportunistic or seasonal habitat (Fisler 1965; Johnson and Shellhammer 1988; Service 2010).

Table 1. Suitable salt marsh harvest mouse habitat within the action area.

Work Area	Wetland Habitat (acres)	Upland Habitat (acres)	Total Salt Marsh Harvest Mouse Habitat (acres)
WMUs 10/11/14	5.14	8.77	13.91
WMU 31	14.79	16.97	31.76
WMU 32	2.36	5.04	7.40
TOTAL	22.29	30.78	53.07

Despite the overall low quality of potential habitat within the WMUs, there is a moderate potential that the WMUs could support a population of the salt marsh harvest mouse. The action area could have occasional, opportunistic spillover from surrounding potential habitat areas. A source population of the salt marsh harvest mouse could persist within densely vegetated areas of the WMUs.

Occurrences near Cordelia Slough Preserve

The CNDDDB reports the occurrence of the salt marsh harvest mouse at the Roos Club about 3,200 feet northeast of the Cordelia Slough Preserve (CNDDDB occurrence number 179; CDFW 2017). The San Francisco Estuary Institute reports the following survey data for salt marsh harvest mice within 2,500 feet of the Cordelia Slough Preserve (<http://www.sfei.org/content/salt-marsh-harvest-mouse-database-and-maps#sthash.WTXwQppi.dpbs>; San Francisco Estuary Institute, undated): 18 salt marsh harvest mouse captured during 284 trapping nights in diked marsh habitat at Goodyear Slough about 2,500 feet west of the proposed Cordelia Slough Preserve (CE = 6.34; site number 446; California Department of Water Resources and CDFW, unpubl. data, 1999).

Surveys for the salt marsh harvest mouse were conducted by the U.S. Geological Survey in April 2009 on the duck club property adjacent to the northeastern edge of the Cordelia Slough Preserve (U.S. Geological Survey 2009). The salt marsh harvest mouse was found on the first night at four out of the five trap locations across the adjacent duck club property site, and a total of nine individuals were captured. Of these, a female salt marsh harvest mouse was in early breeding condition and three of the males were in reproductive condition. Two of the salt marsh harvest mice were captured within 660 feet northeast of the Cordelia Slough Preserve. U.S. Geological Survey personnel concluded that the captures per trap nights indicates a relatively large population of salt marsh harvest mouse at the adjacent duck club property in comparison with other sites in northern San Pablo Bay, and that the timing of these captures in early spring indicates that this site has a resident population rather than transient dispersing individuals. In addition, it was noted that the presence of reproductively mature individuals indicates that the site is being used as a breeding source (U.S. Geological Survey 2009 cited in Wildlands 2013).

Five salt marsh harvest mice were captured during 100 trapping nights at the Cordelia Slough Preserve in June 2014 (K. Allan, WRA, *in litt.* 2014). Salt marsh harvest mice were captured within the following habitat types at the Cordelia Slough Preserve: pickleweed-dominated managed marsh, invasive pepperweed-dominated refugia habitat, and common reed-dominated tidal marsh (K. Allan, WRA, *in litt.* 2014). Due to known recent occurrence of the salt marsh harvest mouse at the Cordelia Slough Preserve, the proximity to other occurrences, and the availability of suitable high quality pickleweed marsh habitat at the Cordelia Slough Preserve,

the Service believes the salt marsh harvest mouse is likely to occur within all suitable habitat at the Cordelia Slough Preserve.

Suisun Bay Area Recovery Unit

The proposed project and the Cordelia Slough Preserve occur within the Recovery Plan's Suisun Bay Area recovery unit for the salt marsh harvest mouse (Service 2013a). The Suisun Bay Area recovery unit is within the range of the northern subspecies of the salt marsh harvest mouse (*R. r. halicoetes*) (Service 2013a). The Suisun Bay Area recovery unit includes suitable or restorable tideland habitats in the Suisun Bay area from Carquinez Strait to the edge of the Sacramento-San Joaquin River Delta (Delta) (legal Delta boundary), representing the eastern extent of the range of the salt marsh harvest mouse. It is separated from the San Pablo Bay recovery unit by gaps in habitat in the Carquinez Strait and intervening hills. Limited populations of salt marsh harvest mouse exist within the Suisun Bay Area recovery unit.

The action area for the proposed project occurs near one of the largest and most stable populations of the salt marsh harvest mouse within the Suisun Bay Area recovery unit (the tidal marshes along the Contra Costa County shoreline between Point Edith and Middle Point) (Service 2013a). The Recovery Plan (page 260, Figure III-8, Segment B; Service 2013a) identifies Hastings Slough immediately east of the proposed project area as a priority area for likely future tidal marsh restoration.

The Cordelia Slough Preserve occurs within the Western Suisun/Hill Slough marsh complex of the Suisun Bay Area recovery unit. One of the criteria in the Recovery Plan for the downlisting of the salt marsh harvest mouse to threatened is for the protection, management, and restoration of at least 1,000 acres of suitable marsh habitat within the Western Suisun/Hill Slough marsh complex including five viable habitat areas each 150 acres or more in size (Table III-3 in Service 2013a). The proposed preservation of the diked wetlands within the Cordelia Slough Preserve could count toward the downlisting criteria for the protection, management, and restoration of suitable marsh habitat within the Western Suisun/Hill Slough marsh complex. However, the preservation of the diked wetlands of the Cordelia Slough Preserve would not count toward the downlisting criteria for the protection of a viable habitat area as defined in the Recovery Plan unless the diked wetlands were restored to tidal marsh (Service 2013a).

The proposed Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge occurs within the Recovery Plan's San Pablo Bay Recovery Unit for salt marsh harvest mouse (Service 2013a).

Suisun Marsh Habitat Management, Preservation and Restoration Plan

On April 21, 2014, the U.S. Bureau of Reclamation and the Service issued the Record of Decision for the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* (U.S. Bureau of Reclamation and Service 2014). The *Suisun Marsh Habitat Management, Preservation and Restoration Plan* is a comprehensive 30-year framework for a broad partnership to restore 5,000 to 7,000 acres of marsh to tidal wetlands and protect and enhance more than 40,000 acres of managed wetlands within the Suisun Marsh near the City of Fairfield, Solano County, California (U.S. Bureau of Reclamation, Service, and CDFW 2013). The objectives of the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* include

improving habitat for multiple special-status species including the salt marsh harvest mouse; maintaining the heritage of waterfowl hunting and other recreational opportunities; improving water quality to assist fish migration and spawning; and improving and maintaining the levee system to protect property, infrastructure, and wildlife habitats from flooding. The Cordelia Slough Preserve occurs within Suisun Marsh Region 1 of the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* area (Figure 2 in U.S. Bureau of Reclamation, Service, and CDFW 2013). Between 8.4 and 12.6 percent (1,000 to 1,500 acres) of existing managed wetlands within Suisun Marsh Region 1 will be restored to tidal marsh within 30 years under the *Suisun Marsh Habitat Management, Preservation and Restoration Plan* (Table 2 in U.S. Bureau of Reclamation, Service, and CDFW 2013).

California Clapper Rail

California clapper rails are unlikely to occur within the diked seasonal wetlands and grasslands within the proposed project footprint because the wetlands are not tidal. However, California clapper rails may occur infrequently within the action area in the tidal marsh of the adjacent Point Edith Wildlife Area near WMUs 31 and 10/11/14. A California clapper rail was last detected within the action area in the tidal marsh of the adjacent Point Edith Wildlife Area in 2009 when an individual was observed (by vocalization) moving through the tidal marsh near WMU 31 (WRA 2016a, 2016b). No other California clapper rails have been detected within 700 feet of the proposed project footprint during protocol-level surveys conducted during nine consecutive years (2009-2017) at WMU 31 and four consecutive years (2014-2017) at WMUs 10/11/14 and 32 (WRA 2008a, 2008c, 2008d, 2009f, 2009g, 2009h, 2011b, 2012b, 2013b, 2014b, 2015, 2016a, 2016b). Based on the known occurrence of the California clapper rail within the action area in 2009 and the availability of suitable tidal marsh breeding habitat within the adjacent Point Edith Wildlife Area, it is likely that a breeding pair of California clapper rails will occur within the action area at the adjacent Point Edith Wildlife Area during the proposed project's six-year construction period.

The proposed project occurs within the Recovery Plan's Suisun Bay Area Recovery Unit for the California clapper rail (Service 2013a). California clapper rails are present sporadically and in low numbers at various locations throughout the Suisun Marsh area. The proposed Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge occurs within the Recovery Plan's San Pablo Bay Recovery Unit for the California clapper rail (Service 2013a).

Effects of the Action

Direct effects of the proposed project are effects occurring within the action area during construction of the proposed project. Direct effects may be temporary (habitat restored to pre-project conditions within 24 months of the initial disturbance) or permanent (lasting more than 24 months). Indirect effects are the effects of the proposed project generally occurring later in time after construction has been completed (*e.g.*, degradation of habitat due to the spread of invasive plant species). The direct and indirect effects of the proposed project on the salt marsh harvest mouse and California clapper rail are summarized below.

Salt Marsh Harvest Mouse*Habitat Disturbance*

Areas of suitable salt marsh harvest mouse habitat that will be temporarily disturbed or permanently lost are illustrated in the map in Figure 1. Table 2 below summarizes the amount of habitat for the salt marsh harvest mouse that will be temporarily disturbed or permanently lost by the proposed project within each WMU. The proposed project will result in the temporary disturbance of a total of 5.46 acres of suitable wetland habitat and 19.18 acres of suitable upland habitat for the salt marsh harvest mouse. The proposed project will result in the permanent loss of a total of 2.96 acres of suitable wetland habitat and 8.31 acres of suitable upland habitat for the salt marsh harvest mouse. The proposed project will avoid the disturbance of 17.16 acres of suitable habitat for the salt marsh harvest mouse within the WMUs within the 110-acre project area (Figure 1).

Table 2. Salt marsh harvest mouse habitat disturbance.

Work Area	Wetland Habitat (acres)	Upland Habitat (acres)	Total Salt Marsh Harvest Mouse Habitat (acres)
Temporary Disturbance			
WMUs 10/11/14	2.47	4.41	6.88
WMU 31	2.99	14.77	17.76
WMU 32	0.00	0.00	0.00
TOTAL Temporary	5.46	19.18	24.64
Permanent Loss			
WMUs 10/11/14	0.86	3.35	4.21
WMU 31	0.00	0.00	0.00
WMU 32	2.10	4.96	7.06
TOTAL Permanent	2.96	8.31	11.27

Temporary effects will result in the temporary loss of salt marsh harvest mouse foraging and cover habitat. Construction activities associated with the removal of wastes in WMUs 10 and 11 will temporarily disturb 6.88 acres of salt marsh harvest mouse habitat. Construction activities associated with excavation and backfilling in WMU 31 will temporarily disturb about 17.76 acres of salt marsh harvest mouse habitat including the construction of an access road along the north side of WMU 31 (1.7 acres of salt marsh harvest mouse habitat disturbed), which will be restored in the uplands. Permanent loss of salt marsh harvest mouse habitat will occur as a result of the installation of a cap over WMU 14 (4.21 acres of salt marsh harvest mouse habitat lost). Construction of a cap at WMU 32 will result in the permanent loss of 7.06 acres of salt marsh harvest mouse habitat. The disturbance of suitable grassland habitat will remove habitat the salt marsh harvest mouse utilizes for foraging, dispersal, and sheltering. The disturbance of suitable wetland habitat will remove habitat the salt marsh harvest mouse utilizes for breeding, foraging, dispersal, and sheltering. Temporarily disturbed habitat within the action area will be restored to pre-construction conditions or better within 24 months of the initial disturbance under a Service-approved HMMP. Salt marsh harvest mice will also benefit in the long term from the cleanup of hazardous materials from the proposed project footprint thereby reducing their exposure to hazardous materials that could otherwise have lethal or sublethal effects on salt marsh harvest mice within the WMUs. Additionally, salt marsh harvest mice around Suisun Bay may also

benefit from the cleanup of hazardous materials from the proposed project footprint that could otherwise enter tidal marsh habitat around Suisun Bay by leaching into groundwater or during extreme flooding events or with future sea level rise.

As noted previously in the *Description of the Action* section, the project proponent has also proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the effect on the salt marsh harvest mouse of the proposed project's anticipated incidental take, resulting from the temporary disturbance and the permanent loss of habitat described above. The compensatory habitat proposed will be in the form of the preservation and management in perpetuity of 83.09 acres of suitable habitat for the salt marsh harvest mouse at Wildlands' Cordelia Slough Preserve in Suisun Bay within the Suisun Bay Area recovery unit under a Service-approved long-term management plan with a fully funded endowment (Wildlands 2015). This component of the action will have the effect of protecting and managing lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat lost as a result of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species. In addition, the salt marsh harvest mouse is also likely to benefit from the restoration of 5.5 acres of suitable tidal marsh/high-tide refuge habitat for the California clapper rail in the Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge within the San Pablo Bay recovery unit.

Direct Effects to Individuals

Any salt marsh harvest mice occurring within the proposed project area during construction activities could be injured or killed by being crushed by the use heavy equipment within suitable wetland and grassland habitat. Individual salt marsh harvest mice may be displaced by noise and vibrations associated with construction activities and the operation of heavy equipment within and adjacent to suitable habitat. Displaced salt marsh harvest mice may have to compete for resources in occupied habitat and may be more vulnerable to predators. Disturbance of female salt marsh harvest mice from March to November may cause abandonment or failure of the current litter. Displaced salt marsh harvest mice may suffer from increased predation, competition, mortality, and reduced reproductive success.

The type and severity of effect depends on several factors, including the intensity and characteristics of the sound, the distance of the salt marsh harvest mice from the source, the timing of actions, and the frequency and duration of the noise-generating activities. The range of effects potentially includes behavioral effects, physiological stress, physical injury, and mortality.

ART will minimize the potential for injury and mortality of salt marsh harvest mice and reduce the level of disturbance during construction activities within suitable salt marsh harvest mouse habitat by having a Service-approved biological monitor supervise the removal of all vegetation within the work area to bare ground. Prior to removal of vegetation, the biologist will walk the work zone to ensure no salt marsh harvest mice or their nests occur within the work zone. In potential salt marsh harvest mouse habitat areas, vegetation will be removed using a two-step process by which vegetation will be removed to bare ground in a manner to enable and

encourage salt marsh harvest mice to move out and away from the construction area. Tall vegetation will first be removed using a walk behind mower with the blade set at a high ground clearance to avoid direct mortality to the salt marsh harvest mouse. This will allow subsequent removal of vegetation to the ground surface using string trimmers under the supervision of a Service-approved biological monitor since visibility of the ground surface will be possible given the short stature of the vegetation. Once vegetation removal is complete, temporary exclusion fencing will be placed around a defined work area under the supervision of a Service-approved biological monitor prior to the start of construction activities preventing salt marsh harvest mice from moving into construction areas. If a salt marsh harvest mouse is encountered during construction, activities within 100 feet of the mouse will cease until the mouse leaves the work area of its own volition, and it has been determined by the biologist that the mouse will not be harmed. If the mouse does not move, the Service-approved biologist will contact the Service for guidance.

ART will minimize the potential for attracting predators of the salt marsh harvest mouse to the work area by enclosing all foods and food-related trash items in sealed trash containers and properly disposing of all trash offsite.

Construction personnel will receive Service-approved worker environmental awareness training from a Service-approved biologist. The training will include a description of the salt marsh harvest mouse, including natural history and habitat, a review of the species listing, general protection measures to be implemented to protect the species, and a delineation of the limits of the work areas.

No nighttime work is planned; however, if nighttime work is necessary the applicant will direct the lighting away from potential salt marsh harvest mouse habitat outside the exclusion fence and use lighting that minimizes backward and side lighting.

Invasive Plant Species

The proposed project has the potential to degrade salt marsh harvest mouse habitat through the introduction of invasive weeds during proposed project construction. Invasive weeds, such as perennial pepperweed, could spread into marsh habitats when seeds are attached to vehicles, equipment, and clothing. The spread of perennial pepperweed and other invasive plants can displace native marsh vegetation and lower habitat quality for salt marsh harvest mice by reducing the amount of plants they use for cover, nesting, and food, such as marsh gumplant and pickleweed. Perennial pepperweed provides poor upland refugia cover because the plant is leafless in the winter when the salt marsh harvest mouse is in most need of suitable upland refugia cover during the more frequent winter extreme high tides and storm events. Without suitable upland refugia cover, the salt marsh harvest mouse is more vulnerable to predation during extreme high tide and flooding events. ART will reduce the potential for the introduction and spread of invasive plant species by restoring all temporarily disturbed habitats with suitable native plant species under a Service-approved HMMP.

Contamination of Suitable Habitat

Suitable wetland and upland habitat for the salt marsh harvest mouse could be degraded or contaminated if hazardous materials were spilled during the excavation of waste material from

the WMUs. Salt marsh harvest mice could be injured or killed if exposed to toxic substances or indirectly affected if hazardous materials degraded or stunted the growth of suitable vegetative cover the mouse utilizes for foraging, nesting, and sheltering. ART will minimize the potential for the contamination and degradation of suitable habitat for the salt marsh harvest mouse during waste cleanup within the WMUs by removing and consolidating the waste materials, properly disposing of wastes off-Refinery, or consolidating and capping the wastes within the WMUs with a prescriptive Title 27 low-permeability, engineered alternative soil cap with an erosion-resistant surface of gravel, rock, or other low-growing, vegetated ground cover material. Existing surface seeps of oily waste will be excavated at WMU 32 down to the top of the groundwater table (*i.e.*, about 4 feet below ground surface), and either disposed off-Refinery or consolidated at WMU 14. The waste excavations will be backfilled with clean soil to approximately pre-excavation grades and re-vegetated. The caps of the closed WMUs will be regularly inspected, maintained, and repaired/ upgraded in accordance with SFRWQCB-approved Closure and Post-Closure Maintenance Plans. BMPs will be implemented to minimize erosion and sedimentation. Possible BMPs include, but are not limited to, silt fencing, straw wattles, and watering. Additionally, ART will implement water quality BMPs, a Storm Water Pollution Prevention Plan, and an emergency spill containment and contingency plan to minimize the potential for the degradation of suitable habitat. The proposed project will reduce the potential for the contamination of suitable salt marsh harvest mouse habitat within the WMUs and adjacent areas within the long-term by properly disposing of, consolidating, and capping the hazardous wastes under an erosion-resistant cap.

California Clapper Rail

Construction Noise

No suitable tidal marsh habitat for the California clapper rail will be directly disturbed by the proposed project. However, breeding California clapper rails in the tidal marsh of the adjacent Point Edith Wildlife Area may be disturbed by construction noise from the proposed project during the rail's breeding season. Figure 2 below illustrates the extent to which noise levels within suitable tidal marsh habitat in the adjacent Point Edith Wildlife Area will be elevated above ambient conditions due to proposed project construction noise. Suitable tidal marsh breeding habitat for the California clapper rail in the adjacent Point Edith Wildlife Area will receive noise levels elevated 8 to 13 decibels above ambient conditions due to proposed project construction (M. Carr, Extant Acoustical Consulting, LLC, *in litt.* 2014) including an area where a California clapper rail was observed in 2009 (WRA 2015). The additional noise from proposed project construction may result in California clapper rails avoiding the tidal marsh near the proposed project footprint. California clapper rails are particularly sensitive to noise disturbance during the rail's breeding season. For example, Albertson (1995) documented a California clapper rail abandoning its territory in Laumeister Marsh in south San Francisco Bay shortly after a repair crew worked on a nearby transmission tower. The rail did not establish a stable territory within the duration of the breeding season. As a result of this territorial abandonment, the opportunity for successful reproduction during the breeding season was eliminated. Thus proposed project construction during the breeding season may result in California clapper rails abandoning breeding territories near the proposed project. However, protocol-level surveys conducted within the action area between 2009 and 2017 demonstrate the lack of California

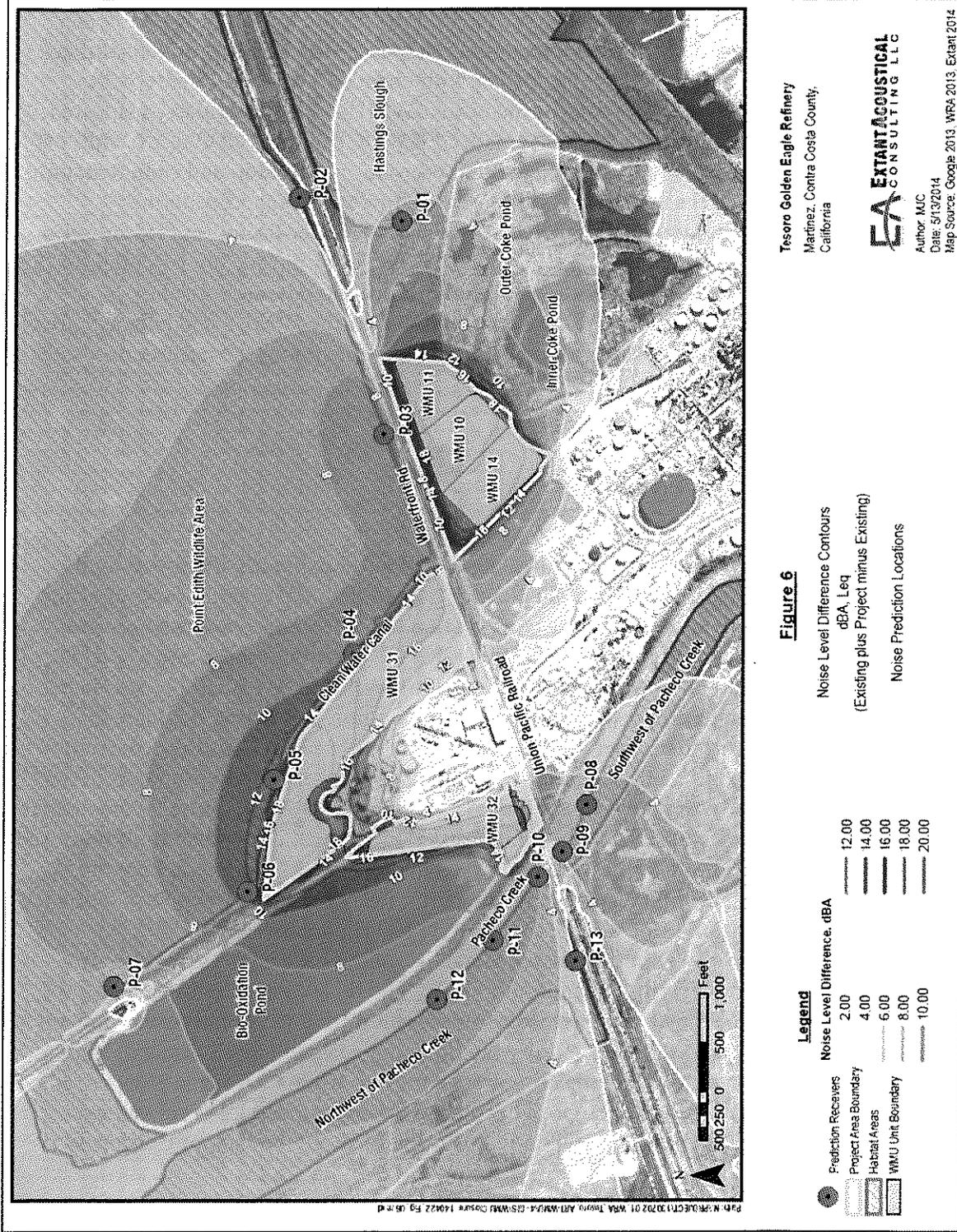


Figure 2. Estimated increase in noise levels above ambient conditions due to proposed project construction (copied from Figure 6 in M. Carr, Extant Acoustical Consulting, LLC, *in litt.* 2014).

clapper rails within the action area during recent years (WRA 2017b). A single California clapper rail was observed near WMU 31 in 2009 (WRA 2015), but no California clapper rails have been detected in the action area since 2009 during annual protocol-level surveys (WRA 2017b). Therefore, the potential for and number of breeding California clapper rails that may be harassed by proposed project construction is likely to be low. However, based on the known occurrence of a California clapper rail within the action area eight years ago and suitable tidal marsh breeding habitat remaining within the action area, the Service believes the potential for breeding California clapper rails to be disturbed during the six-year construction period is not discountable and is likely to occur. The Service estimates that no more than one breeding pair of California clapper rails will be harassed by construction noise during the six years of proposed project construction during the breeding season.

As noted previously in the *Description of the Action* section, the project proponent has also proposed a set of conservation measures, including the commitment to provide compensatory habitat as a condition of the action. This compensatory habitat is intended to minimize the effect resulting from the disturbance of a breeding pair of California clapper rails as described above. The compensatory habitat proposed will be in the form of the funding of \$357,500 for the restoration of at least 5.5 acres of suitable tidal marsh/high-tide refuge habitat for the California clapper rail in the Sonoma Creek Marsh Enhancement Project at the San Pablo Bay National Wildlife Refuge within the San Pablo Bay recovery unit under a Service-approved restoration plan. This component of the action will have the effect of restoring lands for the species' conservation in perpetuity. The compensatory lands will provide suitable habitat for breeding, feeding, or sheltering commensurate with or better than habitat at the Point Edith Wildlife Area where breeding California clapper rails may be disturbed during construction of the proposed project. Providing this compensatory habitat as part of a relatively large, contiguous block of conserved land may contribute to other recovery efforts for the species.

Remediation of Hazardous Materials

California clapper rails may also benefit from the cleanup of hazardous materials from the proposed project footprint that could otherwise enter tidal marsh habitat around Suisun Bay by leaching into groundwater or during extreme flooding events or with future sea level rise. Schwarzbach *et al.* (2003) found that California clapper rail eggs with low rates of hatchability at several marshes around San Francisco Bay showed evidence of chemical contamination. The report found that contamination appeared to exert an adverse effect on hatchability: "While all marshes had impaired hatchability, the marshes with the lowest hatchability were also adjacent to potential contaminant sources— a hazardous waste site near Laumeister and an oil refinery near Wildcat" (Schwarzbach *et al.* (2003)). Therefore, the cleanup of hazardous materials from the proposed project footprint may benefit the California clapper rail in the long-term by reducing the entry of contaminants into Suisun Bay that may reduce egg viability in California clapper rail nests around Suisun Bay.

Cumulative Effects

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. ART redesigned the

Residual Acid Tar Interim Corrective Action at WMU 32 to avoid the disturbance of salt marsh harvest mouse habitat (B. Clarke, WRA, *in litt.* 2016). However, ART's implementation of the Residual Acid Tar Interim Corrective Action at WMU 32 resulted in the accidental spill of grout into tidal marsh habitat for the salt marsh harvest mouse along Pacheco Creek adjacent to WMU 32 on December 7, 2016 (T. Fitzpatrick, ART, pers. comm. 2016). Cleanup actions for the grout spill resulted in the permanent removal of about 0.002 acre of suitable wetland habitat for the salt marsh harvest mouse along Pacheco Creek adjacent to WMU 32 (B. Clarke, WRA, *in litt.* 2017; M. Osowski, WRA, *in litt.* 2017b). The permanent removal of salt marsh harvest mouse wetland habitat due to the grout spill cleanup resulted in the loss of a small amount of suitable breeding, foraging, and dispersal habitat for the salt marsh harvest mouse along Pacheco Creek. ART will compensate for the permanent removal of 0.002 acre of salt marsh harvest mouse habitat due to the grout spill by funding the preservation in perpetuity of 0.006 acre of salt marsh harvest mouse habitat at Wildlands' Cordelia Slough Preserve in Suisun Bay (B. Clarke, WRA, *in litt.* 2017).

Conclusion

After reviewing the current status of the salt marsh harvest mouse, the environmental baseline for the action area, the effects of the proposed Tesoro WMUs 10/11/14, 31, and 32 Closure Project, and the cumulative effects, it is the Service's biological opinion that the Tesoro WMUs 10/11/14, 31, and 32 Closure Project, as proposed, is not likely to jeopardize the continued existence of the salt marsh harvest mouse. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the following: (1) successful implementation of the conservation measures by ART and their contractors as described in this biological opinion will minimize the adverse effects on individual salt marsh harvest mice; (2) the marginal quality of the habitat that would be disturbed; (3) suitable habitat for the salt marsh harvest mouse will remain onsite due to the restoration onsite of all areas temporarily disturbed under a Service-approved HMMP and the avoidance of disturbing 17.16 acres of suitable habitat for the salt marsh harvest mouse within the WMUs; (4) ART's funding the preservation and management in perpetuity of at least 83.09 acres of salt marsh harvest mouse habitat within the Suisun Bay Area recovery unit under a Service-approved long-term management plan at the Cordelia Slough Preserve; and (5) ART's funding of \$357,500 for the restoration of at least 5.5 acres of tidal marsh/high tide refuge habitat at the San Pablo Bay National Wildlife Refuge.

After reviewing the current status of the California clapper rail, the environmental baseline for the action area, the effects of the proposed Tesoro WMUs 10/11/14, 31, and 32 Closure Project, and the cumulative effects, it is the Service's biological opinion that the Tesoro WMUs 10/11/14, 31, and 32 Closure Project, as proposed, is not likely to jeopardize the continued existence of the California clapper rail. The Service reached this conclusion because the project-related effects to the species, when added to the environmental baseline and analyzed in consideration of all potential cumulative effects, will not rise to the level of precluding recovery or reducing the likelihood of survival of the species based on the following: (1) successful implementation of the conservation measures by ART and their contractors as described in this biological opinion will minimize the adverse effects on individual California clapper rails; (2) no suitable tidal marsh breeding habitat for the California clapper rail will be directly disturbed by the proposed project; (3) the potential for and number of breeding California clapper rails that may be harassed by

construction noise is likely to be low; and (4) ART's funding of \$357,500 for the restoration of at least 5.5 acres of tidal marsh/high tide refuge habitat for the California clapper rail at the San Pablo Bay National Wildlife Refuge.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harass is defined by Service regulations at 50 CFR 17.3 as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harm is defined by the same regulations as an act which actually kills or injures wildlife. Harm is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavior patterns, including breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Corps or ART must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

Amount or Extent of Take

Salt Marsh Harvest Mouse

The Service anticipates incidental take of individual salt marsh harvest mice will be difficult to detect or quantify because of the variable, unknown size of any resident population over time, their elusive and cryptic behavior, and the difficulty of finding killed or injured animals. Due to the difficulty in quantifying the number of salt marsh harvest mice that will be taken as a result of the proposed project, the Service is quantifying take incidental to the proposed project as the following:

1. The harassment and non-lethal harm of all salt marsh harvest mice within the 5.46 acres of suitable wetland habitat and 19.18 acres of suitable upland habitat for the salt marsh harvest mouse temporarily disturbed during construction of the proposed project.

2. The harassment and harm of all salt marsh harvest mice within the 2.96 acres of suitable wetland habitat and 8.31 acres of suitable upland habitat for the salt marsh harvest mouse permanently removed during construction of the proposed project.
3. The injury or mortality of two (2) adult salt marsh harvest mice and four (4) juvenile salt marsh harvest mice.

California Clapper Rail

The Service anticipates incidental take of individual California clapper rails will be difficult to detect or quantify because of the variable, unknown size of any resident population over time, their elusive and cryptic behavior, and the difficulty of finding killed or injured animals. Due to the difficulty in quantifying the number of California clapper rails that will be taken as a result of the proposed project, the Service is quantifying take incidental to the proposed project as the following:

1. The harassment of one breeding pair of California clapper rails.

Upon implementation of the following reasonable and prudent measures, incidental take of the salt marsh harvest mouse and California clapper rail associated with the Tesoro WMUs 10/11/14, 31, and 32 Closure Project will become exempt from the prohibitions described in section 9 of the Act. No other forms of take are exempted under this opinion.

Effect of the Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy to the salt marsh harvest mouse and California clapper rail.

Reasonable and Prudent Measures

All necessary and appropriate measures to avoid or minimize effects on the salt marsh harvest mouse resulting from implementation of this project have been incorporated into the project's proposed conservation measures. Therefore, the Service believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of the salt marsh harvest mouse and California clapper rail:

1. All conservation measures, as described in the January 2017 Biological Assessment (WRA 2017a) and restated here in the *Description of the Proposed Action* section of this biological opinion, shall be fully implemented and adhered to. Further, this reasonable and prudent measure shall be supplemented by the terms and conditions below.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the Corps must ensure compliance with the following terms and conditions, which implement the reasonable and prudent measure described above. These terms and conditions are nondiscretionary.

1. The Corps shall include full implementation and adherence to the conservation measures as a condition of any permit or contract issued for the project.
2. The Corps shall ensure that ART has a HMMP reviewed and approved by the Service no more than six months after the initiation of construction of the proposed project.
3. The Corps shall ensure that ART funds the preservation and management of at least 83.09 acres of salt marsh harvest mouse habitat at the Cordelia Slough Preserve prior to the initiation of construction of the proposed project and that a receipt is provided documenting the funding.
4. The Corps shall ensure that ART funds the \$357,500 for the restoration of at least 5.5 acres of California clapper rail habitat at the San Pablo Bay National Wildlife Refuge prior to the initiation of construction of the proposed project and that a receipt is provided documenting the funding.

Monitoring:

- a. For those components of the action that will result in habitat degradation or modification whereby incidental take in the form of harm is anticipated, the Corps shall provide a precise accounting of the total acreage of habitat impacted to the Service after completion of construction.
- b. The Corps shall immediately contact the Service's San Francisco Bay-Delta Fish and Wildlife Office (BDFWO) at (916) 930-5634 to report direct encounters between listed species and project workers and their equipment whereby incidental take in the form of harassment, harm, injury, or death occurs. If the encounter occurs after normal working hours, the Corps shall contact the BDFWO at the earliest possible opportunity the next working day. When injured or killed individuals of the listed species are found, the Corps shall follow the steps outlined in the Salvage and Disposition of Individuals section below.
- c. The Corps shall provide annual reports to the Service during the post-construction monitoring period for the HMMP on the status of revegetation and invasive plant species control within the action area in meeting the success criteria.
- d. Report sightings of any listed or sensitive animal species to the CNDDDB of the CDFW.

Salvage and Disposition of Individuals:

Injured listed species must be cared for by a licensed veterinarian or other qualified person(s), such as the Service-approved biologist. Dead individuals must be sealed in a resealable plastic bag containing a paper with the date and time when the animal was found, the location where it was found, and the name of the person who found it, and the bag containing the specimen frozen in a freezer located in a secure site, until instructions are received from the Service regarding the disposition of the dead specimen. The Service contact person is the Assistant Field Supervisor of the Endangered Species Program at the San Francisco Bay-Delta Fish and Wildlife Office at (916) 930-5603.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. The Service recommends the following actions:

1. Restore and preserve tidal marsh and marsh ecotone/transition zone habitat for the salt marsh harvest mouse and California clapper rail within the Suisun Bay Area recovery unit along the Contra Costa County shoreline consistent with the Recovery Plan (Figures III-8 and III-9 on pp.260-261 in Service 2013).
2. Enhance salt marsh harvest mouse habitat within Wildlands' Cordelia Slough Preserve in Suisun Bay in Solano County, California.
3. Implement a predator management program, invasive plant species control plan, and marsh ecotone restoration activities on Tesoro lands within and near suitable tidal marsh habitat for the salt marsh harvest mouse and California clapper rail.
4. Remove non-native trees that provide perch and nest sites for avian predators near suitable habitat for the salt marsh harvest mouse and California clapper rail.
5. Control invasive plant species and plant suitable high-tide refugia cover (*e.g.*, marsh gumplant) in transition zone habitat adjacent to suitable tidal marsh habitat for the salt marsh harvest mouse and California clapper rail.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

REINITIATION—CLOSING STATEMENT

This concludes formal consultation on the Tesoro WMUs 10/11/14, 31, and 32 Closure Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required and shall be requested by the Federal agency or by the Service where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and:

- (a) If the amount or extent of taking specified in the incidental take statement is exceeded;
- (b) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered;
- (c) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or
- (d) If a new species is listed or critical habitat designated that may be affected by the identified action.

If you have any questions regarding this biological opinion on the proposed Tesoro WMUs 10/11/14, 31, and 32 Closure Project, please contact Kim Squires, Section 7 Coordinator, of the San Francisco Bay-Delta Fish and Wildlife Office at the letterhead address, electronic mail (Kim_Squires@fws.gov), or at telephone (916) 930-5634, or Joseph Terry, Senior Biologist, at the Sacramento Fish and Wildlife Office, electronic mail (Joseph_Terry@fws.gov), or at telephone (916) 943-6721.

Sincerely,

A handwritten signature in black ink, appearing to read 'Kaylee Allen', with a long horizontal flourish extending to the right.

Kaylee Allen
Field Supervisor

cc:

Michael McGuire, Geosyntec Consultants, Oakland, California

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Appendix E
Notification of Project and Consultation
Opportunity for Native American Tribes,
prepared by Regional Water Quality Control
Board, 2018

San Francisco Bay Regional Water Quality Control Board

July 6, 2018
Geotracker No.: SL18316736

VIA MAIL & ELECTRONIC MAIL

Antonio Ruiz
Cultural Resources Officer
Wilton Rancheria
9728 Kent Street
Elk Grove, CA 95624
aruiz@wiltonrancheria-nsn.gov

**Subject: Tribal Cultural Resources under the California Environmental Quality Act:
Formal Notification of a San Francisco Bay Regional Water Board Project
and Consultation Opportunity Pursuant to Public Resources Code Section
21080.3.1**

Dear Mr. Ruiz:

The California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), will be acting as lead agency under the California Environmental Quality Act (CEQA) for a project to close and restore waste management units at the Tesoro Martinez Refinery (Refinery) in Martinez, Contra Costa County.

Pursuant to Public Resources Code section 21080.3.1, subdivision (d)¹, we are providing a description of the proposed project, the project location, and the project's point of contact.

Project Location and Description:

The Refinery, located on approximately 2,200 acres along the Carquinez Strait, has operated since 1913 and can process up to 166,000 barrels of crude oil per day. Until the 1980s, the Refinery deposited wastes in areas of its property called waste management units (WMUs). The Water Board is requiring the Refinery to close those WMUs that are no longer being used by removing the wastes or ensuring that the wastes are contained.

The proposed project encompasses the closure of five WMUs (10, 11, 14, 31, and 32) totaling approximately 70 acres, as shown in the attached two figures (ART Figures 1 & 2). All WMUs are low-lying and adjacent to natural and manmade water bodies that flow into Carquinez Strait. Although the WMUs contain petroleum and refining byproducts, including sulfuric acid, wetland habitat has formed in them, supporting shore birds and the endangered salt marsh

¹ Assembly Bill 52 (Gatto, 2014) requires lead agencies to begin consultation for projects subject to the California Environmental Quality Act with California Native American tribes. The law amends section 5097.94 and adds sections 21073, 21074, 21080.3.1, 21080.3.2, 21083.09, 21084.2, and 21084.3 to the Public Resources Code.

harvest mouse. Accordingly, the project will involve not only removal and/or containment of the wastes and contaminated soils in the WMUs but also restoration of this habitat once excavation is complete.

More detailed information on the project background and upcoming actions can be found at the project website:

http://geotracker.waterboards.ca.gov/profile_report.asp?orderby=s.submit_date&global_id=SL18316736&mytab=sitedocuments#sitedocuments

Project Staff Point of Contact:

Vic Pal, Water Resource Control Engineer
San Francisco Bay Regional Water Quality Control Board
1515 Clay St.
Oakland, CA 94612
Vic.Pal@waterboards.ca.gov or (510) 622-2331

Pursuant to Public Resources Code section 21080.3.1, subdivision (b), you have 30 days from the receipt of this letter to request consultation, in writing, with the Water Board. Please address any such request to Vic Pal, and also copy Gita Kapahi, whose contact information is below. Please contact Vic Pal above if you have questions or need additional information about the Tesoro Martinez WMU closure project.

Additional comment opportunities will be available as part of the public review process, which will be announced later this year. The Water Board looks forward to working with the Wilton Rancheria tribe.

Very Respectfully,

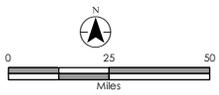
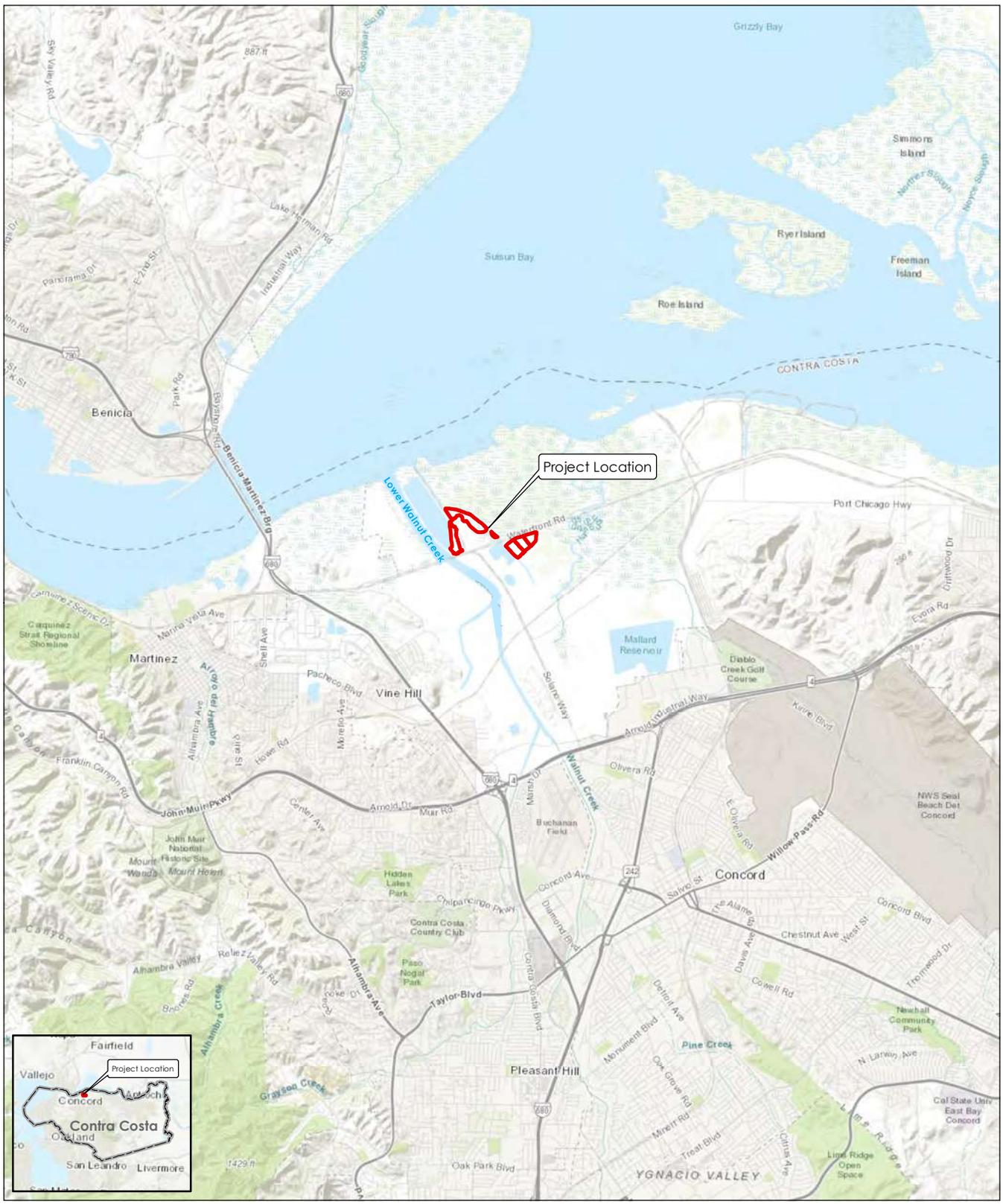


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by Bruce H. Wolfe
Date: 2018.07.06
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Bruce H. Wolfe
Executive Officer

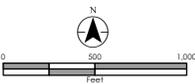
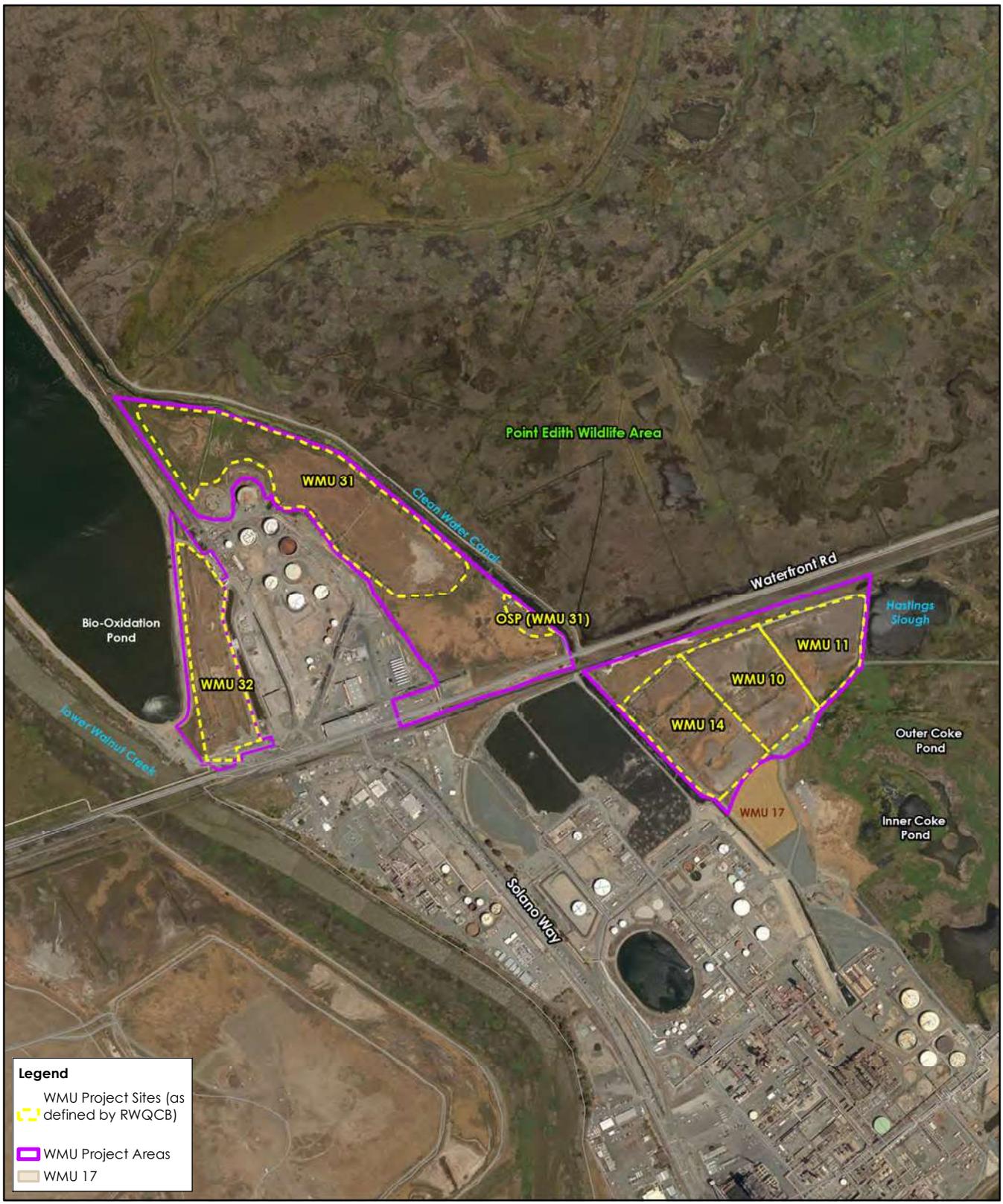
Attachments: ART Figures 1 & 2

CC: Gita Kapahi
Office of Public Participation
State Water Resources Control Board
1001 I Street, 19th Floor
Sacramento, CA 95814
Gita.kapahi@waterboards.ca.gov



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WMU Restoration Project
Figure 2.0-1: Regional Overview



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WMU Restoration Project
Figure 2.0-2: WMU Project Areas

Appendix F
Noise Technical Memorandum, prepared by
Stantec Consulting Services Inc., 2023

To: ART

From: Stantec

File: 185704037

Date: November 16, 2023

Reference: Noise Technical Memo for WMU Restoration Project

INTRODUCTION

NOISE TECHNICAL MEMO PURPOSE

The purpose of this Noise Technical Memo is to support the Avon Remediation Team (ART) Waste Management Unit (WMU) Restoration Project (proposed project) Initial Study Mitigated Negative Declaration (ISMND) document. This memo provides analyses of potential project-related impacts for exposure to excessive noise during construction and operation. This memo has been prepared to analyze the potential construction-related noise impacts generated from the proposed project and estimate the potential operational noise conditions located at the project site. This memo will be used as a supplementary analysis to the ISMND.

Specifically, the purpose of this memo is to assess the existing ambient noise conditions at the nearest sensitive receptors and within the proposed project area. This memo also includes an evaluation of the proposed noise-generating uses that could affect offsite noise-sensitive receptors.

One source of noise generation associated with projects is project construction activities. This includes site construction itself and increased traffic related to worker trips and material transport. Operational noise from a project can be attributed to an increase of traffic count from employees as well as from fixed mechanical equipment used to operate the facility.

PROJECT DESCRIPTION AND LOCATION

The PROJECT is located at the Facility in Contra Costa County, California. The PROJECT would involve the closure of the PROJECT WMUs and mitigation and maintenance of the PROJECT WMUs.

The WMU Restoration Project involves the following elements:

WMUs 10/11/14 – Waste Excavation and Restoration at WMUs 10 and 11; and Perimeter Berm Improvements, Waste Consolidation and Title 27 Compliant Cover at WMU 14

- Closure at WMUs 10/11/14 involves the construction of a consolidation cell in the footprint of WMU 14, excavating waste material from WMUs 10 and 11 and placing the excavated waste into the WMU 14 Consolidation Cell, and installing a cover system. The excavated areas at WMUs 10 and 11 would be backfilled with clean soil and revegetated to restore the impacted wetlands and wildlife habitat in accordance with the implementation, monitoring, and management activities prescribed in the PROJECT Habitat Mitigation and Monitoring Plan (HMMP).

WMU 31 – Waste Excavation and Consolidation at WMU 14 Consolidation Cell

- Closure at WMU 31 involves excavating and consolidating the waste material into the WMU 14 Consolidation Cell. Additionally, waste excavated from the WMU 31 Oily Skim Pond (OSP) would be treated and transported to the WMU 14 Consolidation Cell. The excavated areas at WMU 31 would

Reference: Noise Technical Memo for WMU Restoration Project

be backfilled with clean soil and revegetated to restore the impacted wetlands and wildlife habitat in accordance with the HMMP.

WMU 32 –Title 27 Compliant Cover

- Closure at WMU 32 involves placement of a Title 27 compliant cover system, consisting of a combination of ground surface and elevated structural (metal) elements, over approximately 11.5 acres of existing surface and subsurface waste material. The elevated structure could cover up to 11.5 acres at an elevation of approximately 20 to 30 feet above the existing ground surface. The structure will have a solid roof, open sides, and a perimeter fencing system (consisting of chain link fence, solid wildlife exclusion fencing, and bird netting) to exclude human and fauna entrance into the covered footprint. The elevated structure is an unoccupied space and is categorized as a risk category I facility (defined as building or structure that represents a low hazard to human life in the event of failure). Access to the structure is by exception only for emergency, inspection, and repair personnel.

NOISE FUNDAMENTALS AND TERMINOLOGY

Noise is generally defined as unwanted sound that annoys or disturbs people and potentially causes an adverse psychological or physiological effect on human health. Because noise is an environmental pollutant that can interfere with human activities, evaluation of noise is necessary when considering the environmental impacts of a proposed project.

Sound is mechanical energy transmitted by pressure waves over a medium such as air or water. Sound is characterized by various parameters that include the rate of oscillation of sound waves (frequency), the speed of propagation, and the pressure level or energy content (amplitude). In particular, the sound pressure level is the most common descriptor used to characterize the loudness of an ambient (existing) sound level. Although the decibel (dB) scale, a logarithmic scale, is used to quantify sound intensity, it does not accurately describe how sound intensity is perceived by human hearing. The perceived loudness of sound is dependent upon many factors, including sound pressure level and frequency content. The human ear is not equally sensitive to all frequencies in the entire spectrum, so noise measurements are weighted more heavily for frequencies to which humans are sensitive in a process called A-weighting, written as dB(A) and referred to as A-weighted decibels. There is a strong correlation between A-weighted sound levels and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. Table 1 defines sound measurements and other terminology used in this memo, and Table 2 summarizes typical A-weighted sound levels for different noise sources.

With respect to how humans perceive and react to changes in noise levels, a 1dB(A) increase is imperceptible, a 3 dB(A) increase is barely perceptible, a 6 dB(A) increase is clearly noticeable, and a 10 dB(A) increase is subjectively perceived as approximately twice as loud (Egan 2007). These subjective reactions to changes in noise levels were developed on the basis of test subjects' reactions to changes in the levels of steady-state pure tones or broad-band noise and to changes in levels of a given noise source. These statistical indicators are thought to be most applicable to noise levels in the range of 50 to 70 dBA, as this is the usual range of voice and interior noise levels. The number of agencies and municipalities have developed or adopted noise level standards, consistent with these and other similar studies, to help prevent annoyance and to protect against the degradation of the existing noise environment.

Reference: Noise Technical Memo for WMU Restoration Project

Different types of measurements are used to characterize the time-varying nature of sound. These measurements include the equivalent sound level (L_{eq}), the minimum and maximum sound levels (L_{min} and L_{max}), percentile-exceeded sound levels (such as L_{10} , L_{20}), the day-night sound level (L_{dn}), and the community noise equivalent level (CNEL). L_{dn} and CNEL values typically differ by less than 1 dB. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

For a point source such as a stationary compressor or construction equipment, sound attenuates based on geometry at rate of 6 dB per doubling of distance. For a line source such as free flowing traffic on a freeway, sound attenuates at a rate of 3 dB per doubling of distance (Federal Highway Administration 2011). Atmospheric conditions including wind, temperature gradients, and humidity can change how sound propagates over distance and can affect the level of sound received at a given location. The degree to which the ground surface absorbs acoustical energy also affects sound propagation. Sound that travels over an acoustically absorptive surface, such as grass, attenuates at a greater rate than sound that travels over a hard surface, such as pavement. The increased attenuation is typically in the range of 1–2 dB per doubling of distance. Barriers such as buildings and topography that block the line of sight between a source and receiver also increase the attenuation of sound over distance.

Table 1: Definition of Sound Measurement

Sound Measurements	Sample Heading
Decibel (dB)	A unit-less measure of sound on a logarithmic scale, which indicates the squared ratio of sound pressure amplitude to a reference sound pressure amplitude. The reference pressure is 20 micro-pascals.
A-Weighted Decibel (dB(A))	An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
C-Weighted Decibel (dB(C))	The sound pressure level in decibels as measured using the C- weighting filter network. The C-weighting is very close to an unweighted or flat response. C-weighting is only used in special cases when low-frequency noise is of particular importance. A comparison of measured A- and C-weighted level gives an indication of low frequency content.
Maximum Sound Level (L_{max})	The maximum sound level measured during the measurement period.
Minimum Sound Level (L_{min})	The minimum sound level measured during the measurement period.
Equivalent Sound Level (L_{eq})	The equivalent steady state sound level that in a stated period of time would contain the same acoustical energy.
Percentile-Exceeded Sound Level (L_{xx})	The sound level exceeded xx % of a specific time period. L_{10} is the sound level exceeded 10% of the time. L_{90} is the sound level exceeded 90% of the time. L_{90} is often considered to be representative of the background noise level in a given area.
Day-Night Level (L_{dn})	The energy average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.

November 16, 2023

ART

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Reference: Noise Technical Memo for WMU Restoration Project

Sound Measurements	Sample Heading
Community Noise Equivalent Level (CNEL)	The energy average of the A-weighted sound levels occurring during a 24-hour period with 5 dB added to the A-weighted sound levels occurring during the period from 7:00 p.m. to 10:00 p.m. and 10 dB added to the A-weighted sound levels occurring during the period from 10:00 p.m. to 7:00 a.m.
Peak Particle Velocity (Peak Velocity or PPV)	A measurement of ground vibration defined as the maximum speed (measured in inches per second) at which a particle in the ground is moving relative to its inactive state. PPV is usually expressed in inches/second.
Frequency: Hertz (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure.
Source: Federal Highway Administration 2006a	

Reference: Noise Technical Memo for WMU Restoration Project

Table 2: Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Jet flyover at 1,000 Feet	-110	Rock band
Gas lawnmower at 3 Feet	-100-	
Diesel truck at 50 Feet at 50 MPH	-90-	Food blender at 3 Feet
Noisy urban area, daytime	-80-	Garbage Disposal at 3 Feet
Gas lawnmower, 100 Feet		Vacuum Cleaner at 10 Feet
Commercial area	-70-	Normal Speech at 3 Feet
Heavy traffic at 300 Feet	-60-	
Quiet urban daytime	-50-	Large business office
Quiet urban nighttime		Dishwasher in next room
Quiet suburban nighttime	-40-	Theater, large conference room (Background)
Quiet rural nighttime	-30-	Library
	-20-	Bedroom at night, concert hall (Background)
	-10-	Broadcast/recording studio
	-0-	

Decibel Addition

Because decibels are logarithmic units, sound pressure levels cannot be added or subtracted through ordinary arithmetic. On the dB scale, a doubling of sound energy corresponds to a 3-dB increase. In other words, when two identical sources are each producing sound of the same loudness, their combined sound level at a given distance would be 3 dB higher than one source under the same conditions. For example, if one source produces a sound pressure level of 70 dB(A), two identical sources would not produce 140 dB(A)—rather, they would combine to produce 73 dB(A). The cumulative sound level of any number of sources can be determined using decibel addition.

Vibration

Operation of heavy construction equipment, particularly pile driving and other impact devices such as pavement breakers, create seismic waves that radiate along the surface of the earth and downward into the earth. These surface waves can be felt as ground vibration. Vibration from operation of this equipment can result in effects ranging from annoyance of people to damage of structures. Varying geology and distance will

Reference: Noise Technical Memo for WMU Restoration Project

result in different vibration levels containing different frequencies and displacements. In all cases, vibration amplitudes will decrease with increasing distance.

Perceptible groundborne vibration is generally limited to areas within a few hundred feet of construction activities. As seismic waves travel outward from a vibration source, they excite the particles of rock and soil through which they pass and cause them to oscillate. The actual distance that these particles move is usually only a few ten-thousandths to a few thousandths of an inch. The rate or velocity (in inches per second) at which these particles move is the commonly accepted descriptor of the vibration amplitude, referred to as the peak particle velocity (PPV). Table 3 summarizes typical vibration levels generated by construction equipment (Federal Transit Administration 2006b).

Table 3: Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 Feet
Pile driver (impact)	0.644 to 1.518
Pile drive (sonic/vibratory)	0.170 to 0.734
Vibratory roller	0.210
Hoe ram	0.089
Large bulldozer	0.089
Caisson drilling	0.089
Loaded trucks	0.076
Jackhammer	0.035
Small bulldozer	0.003
Source: Federal Transit Administration 2006b	

Vibration amplitude attenuates over distance and is a complex function of how energy is imparted into the ground and the soil conditions through which the vibration is traveling. The following equation can be used to estimate the vibration level at a given distance for typical soil conditions (Federal Transit Administration 2006b). PPV_{ref} is the reference PPV from Table 3.

$$PPV = \text{PPV}_{\text{ref}} \times (25/\text{Distance})^{1.5}$$

Table 4 summarizes guidelines vibration annoyance potential criteria suggested by Caltrans (California Department of Transportation 2004).

Reference: Noise Technical Memo for WMU Restoration Project

Table 4: Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4
Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Source: California Department of Transportation 2004.		

Table 5 summarizes guideline vibration damage potential criteria suggested by Caltrans (California Department of Transportation 2004).

Table 5: Guideline Vibration Damage Potential Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structure	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5
Notes: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment. Source: California Department of Transportation 2004.		

Reference: Noise Technical Memo for WMU Restoration Project

REGULATORY SETTING

CONTRA COSTA COUNTY GENERAL PLAN

Chapter 11, "Noise Element" in the Contra Costa County General Plan analyzes and quantifies to the extent practical, current and project noise levels for potential community noise issues, such as highways and freeways, railroads, aviation, industrial plants, and other ground stationary noise sources. Figure 11-6 in the Noise Element identifies land use compatibility noise standards for land uses affected by transportation and non-transportation noise sources. As shown in Figure 1, for industrial and agricultural uses that are affected by noise sources, the "normally acceptable" exterior noise level is up to 75 dB(A) Ldn. Exterior noise levels between 70 dB(A) and 80 dB(A) Ldn are considered "conditionally acceptable" and should be undertaken only after a detailed analysis of the noise reduction requirements are made. Exterior noise levels above 80 dB(A) Ldn are considered "normally unacceptable". New construction or development should generally be discouraged in these areas. If new construction or development does proceed, a detailed analysis of the noise reduction requirements would be required.

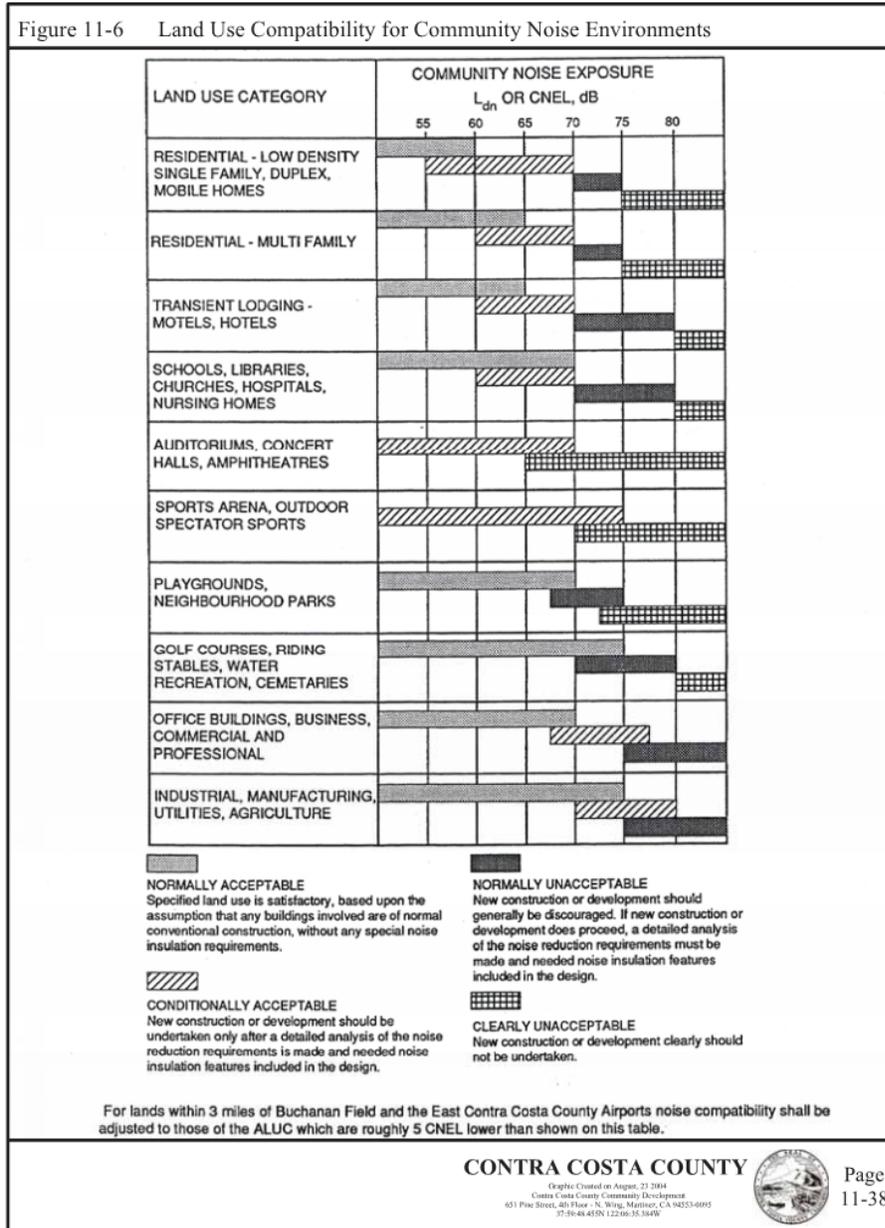
For single-family residential uses, "Normally Acceptable" levels are 60 dB(A) Ldn and below, "Conditionally Acceptable" levels are between 55 and 70 dB(A) Ldn, "Normally Unacceptable" levels are from 70 to 75 dB(A) Ldn, and "Clearly Unacceptable" levels are above 75 dB(A) Ldn.

Specific Policies with the Noise Element include the following:

- Policy 11-8: Construction activities shall be concentrated during the hours of the day that are not-noise-sensitive for adjacent land uses and should be commissioned to occur during normal work hours of the day to provide relative quiet during the more sensitive evening and early morning periods.
- Policy 11-9: Sensitive land use shall be encouraged to be located away from noise areas, or the impacts of noise on these uses shall be mitigated. If residential areas are planned adjacent to industrial noise sources, then a noise study shall be performed to determine the extent of any noise impacts and recommend appropriate noise mitigation measures.

Reference: Noise Technical Memo for WMU Restoration Project

Figure 1: Contra Costa County Noise Guidelines for Land Use Planning



Reference: Noise Technical Memo for WMU Restoration Project

SENSITIVE RECEPTORS

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are considered to be more sensitive to noise intrusion than are commercial or industrial activities. Ambient noise levels can also affect the perceived desirability or livability of a development.

The Project WMUs are located in the northern portion of the Refinery and are generally surrounded by Refinery industrial infrastructure to the west, beyond which lies the Suisun Properties mitigation land; Refinery industrial infrastructure to the south, the Carquinez Strait and Suisun Bay to the north, and the Point Edith Wildlife Area to the east.

The Suisun Properties mitigation land is generally located adjacent to the Refinery to the west and is largely surrounded by open space to the west, industrial uses to the south, the Carquinez Strait and Suisun Bay to the north, and the Refinery to the east.

The Refinery mitigation land is generally surrounded by Refinery industrial infrastructure to the west, Mallard Reservoir to the south, and open space to the north and east.

The closest noise-sensitive receptors to the WMU Restoration project are single-family residences along Arthur Road. These residences are approximately 1.05 miles (5,544 feet) away from WMU 32.

EXISTING AMBIENT NOISE LEVELS

The existing noise environment in a project area is characterized by the area's general level of development due to the high correlation between the level of development and ambient noise levels. Areas which are not urbanized are relatively quiet, while areas which are more urbanized are noisier as a result of roadway traffic, industrial activities, and other human activities.

Contra Costa County as a whole is exposed to several sources of noise, including traffic on major highways, such as US Interstate 680 and California Highway 4, noise from railways, and industrial uses. Traffic noise depends primarily on traffic speed (tire noise increases with speed), proportion of medium and large truck traffic (trucks generate engine, exhaust, and wind noise in addition to tire noise), and number of speed control devices, such as traffic lights (accelerating and decelerating vehicles and trucks can generate more noise).

The loudest source of ambient noise at the project site is anticipated to be operational activity from the refinery itself and traffic along Waterfront Road. According to Figure 11-5C "Noise Contours" in the Contra Costa County General Plan, noise levels along the edge of the project site along Waterfront Road will be within the 60-65 dB(A) Ldn contour. The same figure also shows the existing ambient noise levels at the closest residential receiver to the project site is within the 60-65 dB(A) Ldn contour to Interstate I-680.

ENVIRONMENTAL IMPACT ANALYSIS

EXTERIOR TRAFFIC NOISE LEVEL IMPACTS

The WMU Restoration project is short-term and will not cause a substantial permanent traffic noise increase in ambient noise levels in the project vicinity above the existing levels without the project. Therefore, there is no impact relative to this topic.

Reference: Noise Technical Memo for WMU Restoration Project

INTERIOR TRAFFIC IMPACTS

The WMU Restoration project does not involve the construction of any buildings or uses which are under the restrictions of CalGreen or California Building Code requirements. Therefore, there is no impact relative to this topic.

PROJECT FIXED-SOURCE NOISE IMPACTS

The WMU Restoration project will not have any additional permanent fixed sources of noise after the project is complete. Also, given the 5,544 feet distance between the project site and the closest residential receiver, no fixed-source noise impacts would occur at the closest residential receiver or other sensitive land use.

SHORT-TERM CONSTRUCTION NOISE IMPACTS

Two types of short-term noise impacts could occur during construction of the proposed project. First, construction crew commutes and the transport of construction equipment and materials to the project site would incrementally increase traffic on roads leading to the project site. This increased traffic would be composed of vehicles, medium trucks, and heavy trucks. All construction traffic required to leave the refinery will travel through the refinery and immediately access Interstate 680 or CA Highway 4. No construction vehicle traffic will travel through any residential or commercial areas to access the highways. The project will not expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.

Therefore, the project will not cause increased traffic noise levels at any sensitive receivers and this would be a less than significant impact relative to this topic.

The second type of short-term noise impact is related to noise generated during construction. Each construction stage has its own mix of equipment and, consequently, its own noise characteristics. These various construction operations would change the character of the noise generated at the project site and, therefore, the noise level as construction progresses. Table 6 below lists types of construction equipment that may be used during construction and the maximum and average operational noise level as measured at 5,544 feet from the operating equipment. Again, the 5,544-foot distance represents the distance between WMU 32 and the closest residential receiver off Arthur Road.

Table 6: Summary of Federal Highway Administration Roadway Construction Noise Model at Existing Apartment Receiver

Source	Distance to Nearest Sensitive Receptor	Sound Level at Apartments		
		Lmax, dB(A)	Acoustical Use Factor (%)	Leq, dB(A)
Backhoe	5,544 feet	36.7	40	32.7
Compactor (ground)	5,544 feet	42.3	20	35.3
Concrete Mixer Truck	5,544 feet	37.9	40	33.9

Reference: Noise Technical Memo for WMU Restoration Project

Source	Distance to Nearest Sensitive Receptor	Sound Level at Apartments		
		Lmax, dB(A)	Acoustical Use Factor (%)	Leq, dB(A)
Bulldozer	5,544 feet	40.8	40	36.8
Drill Rig	5,544 feet	38.2	20	31.3
Dump Truck	5,544 feet	35.6	40	31.6
Excavator	5,544 feet	39.8	40	35.8
Forklift	5,544 feet	42.5	40	38.5
Front End Loader	5,544 feet	38.2	40	34.2
Flat Bed Truck	5,544 feet	33.4	40	29.4
Generator	5,544 feet	39.7	50	36.7
Pickup Truck	5,544 feet	34.1	40	30.1
Pneumatic Tools	5,544 feet	44.3	50	41.3
Welder / Torch	5,544 feet	33.1	40	29.1
Tractor	5,544 feet	43.1	40	39.1

Source: FHWA 2006, AQ/GHG assumptions (Appendix A)

The calculated Leq level for all construction equipment at the closest residential receiver is expected to be 41 dB(A) or lower. Referring to Table 2, this level is similar to what is experienced in a quiet suburban nighttime environment. According to the noise contours in the Contra Costa General Plan, a noise level of 41 dB(A) will be significantly lower than what is currently experienced at the closest noise-sensitive receivers. Also, the calculated Leq level for all construction equipment is below the "Normally Acceptable" listed in Figure 11-6 in the Contra Costa General Plan. Therefore, construction noise from the project would not cause a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project and the impact would be less than significant.

SHORT-TERM CONSTRUCTION VIBRATION IMPACTS

Construction equipment that could be used during the project construction would generate vibration levels between 0.003 PPV and 0.089 PPV at 25 feet, as shown below in Table 7. All the groundborne vibration levels are below the Federal Transit Administration vibration threshold at which human annoyance could occur of 0.10 PPV. Additionally, construction activities would be temporary in nature and would likely occur during normal daytime working hours as per the Contra Costa County General Plan. Therefore, construction vibrations are not predicted to cause damage to existing buildings or cause annoyance to sensitive receptors. As such, implementation of the project would have a less than significant impact related to vibration.

Reference: Noise Technical Memo for WMU Restoration Project

Table 7: Vibration Source Levels for Construction Equipment

Type of Equipment	Peak Particle Velocity at 25 Feet	Peak Particle Velocity at 50 Feet	Peak Particle Velocity at 5,544 Feet	Threshold at which Human Annoyance Could Occur	Potential for Project to Exceed Threshold
Large Bulldozer	0.089	0.031	0.00003	0.10	None
Loaded Trucks	0.076	0.027	0.00002	0.10	None
Small Bulldozer	0.003	0.001	0.0000009	0.10	None
Auger/Drill Rigs	0.089	0.031	0.00003	0.10	None
Jackhammer	0.035	0.012	0.00001	0.10	None
Vibratory Hammer	0.070	0.025	0.00002	0.10	None

Source: FTA 2006

AIRPORT NOISE IMPACTS

The nearest public airport to the project site is the Buchanan Field Airport, located approximately 3.23 miles southeast of the project site. The project site falls well outside the 55 dBA CNEL contour line for the Buchanan Airport as shown in Figure 11-5V "Buchanan Airport Noise Contours" in the Contra Costa County General Plan. Therefore, this would be a less than significant impact.

CONCLUSION

Noise generation associated with the proposed work will be attributed to only short-term construction activities and the construction traffic associated with the work. Based on the FHWA RCNM the proposed project will not generate high levels of construction noise at the closest noise-sensitive receivers and will not result in long-term impacts from construction. Traffic associated with construction will be limited to the refinery itself and the surrounding highways. No construction traffic will travel through noise-sensitive neighborhoods. Therefore, the project will have a less than significant to no impact on the surrounding communities.

Stantec Consulting Services Inc.


Tracie Ferguson

Senior Associate - Acoustics

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Appendix G
Traffic Impact Study, prepared by Stantec
Consulting Services Inc., 2023

To:	ART	From:	Cathy Lawrence & Daryl Zerfass
File:	185704037	Date:	November 14, 2023

Reference: ART Project Construction Truck Traffic Summary

The ART project is located on Waterfront Road east of Interstate 680 (I-680) in Contra Costa County. The project involves an eight-year construction period. Hauling of soils and other materials resulting in off-site truck traffic is expected to be at the highest levels during Year 1 and Year 6, with truck traffic associated with construction during Years 2 through 5 and Years 7 and 8 generally being lower. This memo summarizes the off-site truck traffic from the proposed project during Year 1 and Year 6 construction activities as the worst-case conditions.

Year 1

Soils transport will be carried in CT660 tractor trailer trucks toward the west via Highway 4 and south on I-680 toward Buttonwillow. These trucks will enter and exit the south gate and travel along Solano Way between the project site and Highway 4. It is anticipated that five trucks will make this drive daily for 20 working days, resulting in 10 average daily trips (ADT) (5 inbound trips, 5 outbound trips) added to Solano Way. Assuming an eight-hour workday, the average number of trucks on Solano Way is one or two trucks per hour. In addition, conservatively assuming that during the peak one hour the number of trucks is twice the average, the number of trucks on Solano Road is two to three trucks, which equates to approximately one truck every 24 minutes during the peak one hour for 20 working days.

Materials deliveries will be made on CT660 tractor trailer trucks from Clear Lake and Dixon north of the project site via I-680. These trucks will enter and exit the north gate and travel along Waterfront Road between the site and I-680. It is anticipated that five trucks will make the round-trip between the project site and Clear Lake twice each day for 40 working days for a total of 20 ADT (10 inbound, 10 outbound). Similarly, it is estimated that four trucks will make the round-trip between the site and Dixon three times a day for 33 working days, resulting in 24 ADT (12 inbound trips, 12 outbound trips).

Conservatively assuming that the Year 1 materials delivery phases from Clear Lake and Dixon overlap, the trucks headed toward I-680 along Waterfront Road total 44 ADT. During an eight-hour workday, the average number of trucks on Waterfront Road is approximately five to six trucks per hour. Also, conservatively assuming that during the peak one hour the number of trucks is twice the average, the number of trucks on Waterfront Road is 10 to 11 trucks, or approximately one truck every five or six minutes. This amount of truck traffic would continue for 33 working days, with approximately five trucks (i.e., one truck every 12 minutes) during the peak one hour for the remaining 7 working days.

These volumes of truck traffic on Waterfront Road and Solano Way are insignificant and will only occur for a short time during Year 1.

Year 6

During Year 6, gravel will be hauled in on CT660 tractor trailer trucks from Lake Herman Quarry via I-680. These trucks will enter and exit the north gate and travel along Waterfront Road between the site and I-680. It is anticipated that five trucks will make two round-trips each day for a total of 20 ADT (10 inbound trips, 10 outbound trips) for 180 working days. During a typical eight-hour workday, the average is two to three trucks per hour, or approximately five trucks during the peak one hour—equivalent to one truck every 12 minutes.

November 14, 2023

ART

Page 2 of 2

Reference: ART Project Construction Truck Traffic Summary

Conclusions

The volume of truck traffic from the project on Waterfront Road or Solano Way during construction is insignificant and will have no noticeable effect on roadway traffic conditions.

Please contact Cathy or Daryl if you have any questions.

Stantec Consulting Services Inc.



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c. Anna Radonich, Stantec

Appendix H
Health Risk Modeling Report, prepared by
Geosyntec Consultants, 2023

Prepared for

**Avon Remediation Team
1111 Broadway, 6th Floor
Oakland, California**

**MARATHON MARTINEZ
RENEWABLE FUELS FACILITY
WASTE MANAGEMENT UNIT
RESTORATION PROJECT
HEALTH RISK ASSESSMENT MODELING
REPORT**

Prepared by

Geosyntec 
consultants

engineers | scientists | innovators

3530 Hyland Ave, Suite 100
Costa Mesa, CA 92626

Geosyntec Project Number HPA1145

December 2023

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ATTACHMENTS

- Attachment A: Health Risk Assessment Modeling Protocol

LIST OF ABBREVIATIONS

BAAQMD	Bay Area Air Quality Management District
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
HARP	Hot Spots Analysis and Reporting Program
HRA	Health Risk Assessment
ISMND	Initial Study of Mitigated Negative Declaration
MEI	Maximum Exposed Individual
RWQCB	Regional Water Quality Control Board
WMU	Waste Management Unit

1.0 INTRODUCTION

The Avon Remediation Team is proposing completion of the Waste Management Unit (WMU) Restoration Project (Project) at the Martinez Renewable Fuels Facility (Facility) in Contra Costa County, California. The Project would involve the closure of inactive WMUs 10, 11, 14, 31, and 32 over a period of eight (8) years and mitigation and maintenance of the Project WMUs.

The Project is currently engaged in the review process per the California Environmental Quality Act (CEQA) to determine potential environmental impacts from planned operations. A preliminary draft Initial Study of Mitigated Negative Declaration (ISMND) is being prepared for the lead agency, the San Francisco Bay Regional Water Quality Control Board (RWQCB). This health risk assessment (HRA) report details the potential health risk impacts to the local community resulting from Project operations to supplement the broader CEQA review. The Project is located in the Bay Area Air Quality Management District (BAAQMD), and BAAQMD would serve as a responsible agency in review of the ISMND.

This HRA report is prepared in response to a request by BAAQMD's planning department to prepare an air quality HRA to supplement the analysis in the CEQA initial study. This HRA report considers potential health risk impact associated with both toxic air contaminants (TACs) and particulate matter 2.5 micrometers or less in aerodynamic diameter (PM_{2.5}). Unless otherwise noted in this report, the air dispersion and health risk modeling were performed consistent with the HRA modeling protocol, dated November 2023, and provided as Attachment A to this document. Additional Project information, including maps of the Project boundaries, is included in Attachment A.

1.1 Contact Information

Project Location: Martinez Renewable Fuels Facility
150 Solano Way
Martinez, CA 94553

Project Contact: Anju Wicke
Avon Remediation Team Coordinator
1111 Broadway, 6th Floor
Oakland, California
510.285.2703
AWicke@Geosyntec.com

2.0 MODELING PROTOCOL REFINEMENTS

A modeling protocol detailing the air dispersion and health risk modeling parameters used to calculate Project health risk impacts was prepared for this assessment and is provided as Attachment A to this document. The following sections discuss modeling parameters that were refined from those detailed in the protocol.

3.1 Fraction of Time at Home

As discussed in the attached modeling protocol, the default fraction of time at home for persons under the age of 16 is 1.00. However, if no schools are exposed to a cancer risk of one (1) in a million or greater, this assumption can be refined to 0.85 for persons less than two (2) years old, and 0.72 for persons between two (2) and 16 years old [BAAQMD, 2016]. Cancer risk modeling using the default fraction of time at home assumption was conducted to characterize health risk impacts at nearby schools. The results of this preliminary modeling are summarized in Table 3-1 below.

Table 3-1: Preliminary Modeling Results for Schools

Location Name	Address	Modeled Coordinates		Cancer Risk
		Easting (m)	Northing (m)	Chances per Million ¹
Las Juntas Elementary School	4105 Pacheco Blvd Martinez, CA 94553	579,775	4,207,270	0.35
Morello Park Elementary School	1200 Morello Park Dr Martinez, CA 94553	579,208	4,206,469	0.23
Sun Terrace Elementary School	2448 Floyd Ln Concord, CA 94520	585,105	4,206,476	0.14
Sun Terrace Pre-School	3585 Port Chicago Hwy Concord, CA 94520	585,374	4,206,378	0.12
Mariah's Daycare	2437 Floyd Ln Concord, CA 94520	585,135	4,206,281	0.15

As presented in Table 3-1, no schools were calculated to be exposed to an increased cancer risk of one (1) in a million or greater due to Project construction and operations. Therefore, the fraction of time at home modeled for this HRA includes 0.85 for persons less than two (2) years old, and 0.72 for persons between two (2) and 16 years old.

¹ Cancer risk is estimated as the chances of developing cancer from exposure per million individuals exposed.

3.0 HEALTH RISK CALCULATIONS

Cancer, chronic health, and acute health risk impacts from Project construction and operation emissions were calculated separately using HARP using the methods detailed in the modeling protocol, provided as Attachment A to this document, and section 2.0 of this document. Total Project cancer, chronic health, and acute health risk impacts are calculated to include impacts from both construction and operation emissions.

4.1 Cancer Risk Impacts

Cancer risk impacts are associated with long-term receptor exposure. Therefore, total Project cancer risk impacts are calculated as the sum of construction and operation cancer risks at each receptor.

4.2 Chronic Health Risk Impacts

Chronic health risk impacts are associated with long-term receptor exposure. Therefore, total Project chronic health risk impacts are calculated as the sum of construction and operation chronic health risks at each receptor. Conservatively, total Project chronic health risk impacts are calculated using the hazard index for the maximally impacted organ system for both construction and operation health risk; however, the maximally impacted organ system for the Project construction and operation scenarios may not be the same.

4.3 Acute Health Risk Impacts

Acute health risk impacts are associated with short-term receptor exposure. Therefore, total Project acute health risk impacts are calculated as the sum of construction and operation acute health risk impact at each receptor.

4.0 RESULTS

PM2.5 ground level concentration and cancer, chronic health, and acute health risk isopleths at the CEQA significance and BAAQMD Rule 2-5-301 threshold levels for residential and worker exposure scenarios, as applicable, are presented in Figure 1 through Figure 6, provided as attachments to this document. The location of the maximum exposed individual (MEI) for each scenario is identified in Figure 1 through Figure 6.

Calculated Project health risk impacts at the MEI locations are presented in **Table 5-1** below.

Table 5-1: Summary of Project Health Risk Impacts

Health Risk Parameter	Unit	Receptor Type	Impact to MEI	CEQA Significance Threshold ²	BAAQMD Rule 2-5-301 Threshold	Above Threshold?
Cancer	Chances per Million ³	Resident	0.6	10	1.0	No
		Worker	0.7			No
Chronic Health	Hazard Index ⁴	Resident	< 0.01	1.0	0.20	No
		Worker	< 0.01			No
Acute Health	Hazard Index	Resident	0.01	1.0	N/A	No
		Worker	0.09			No
PM2.5	$\mu\text{g}/\text{m}^3$	Resident	0.01	0.30	N/A	No
	$\mu\text{g}/\text{m}^3$	Worker	0.08			No

Health risk impacts to the MEIs are primarily associated with Project construction emissions. Health risk impacts associated with Project construction account for at least 90% of total Project cancer and chronic health risk impacts for both residents and workers. In addition, the maximum Project acute health risk impacts were calculated to occur during Project construction for both residents and workers.

Total Project cancer risk impacts are primarily associated with emissions of diesel particulate matter (DPM) from construction equipment and vehicles for both residents and workers. Total Project resident and worker chronic health risks are primarily associated with emissions of arsenic and DPM from constructive fugitive dust. Total Project acute health risks are primarily associated with emissions of nickel and arsenic from construction fugitive dust for both residents and workers.

² [BAAQMD, 2022].

³ Cancer risk is estimated as the chances of developing cancer from exposure per million individuals exposed.

⁴ Chronic health and acute health risks are estimated as a value on the hazard index developed by OEHHA. A hazard index value less than one (1) indicates ambient air concentrations are below the reference exposure levels and are not anticipated to result in adverse health effects.

5.0 SUMMARY AND CONCLUSIONS

This HRA utilized HARP to calculate local cancer, chronic health, and acute health risk impacts associated with the Avon Remediation Team's proposed WMU Restoration Project at the Marathon (previously Tesoro) Martinez Renewable Fuels Facility in Contra Costa County, California. This HRA is prepared to supplement the Project's CEQA review per the request of the BAAQMD's planning department. This HRA conservatively incorporates maximum Project emission rates for the full scheduled duration of Project construction activities, maximum operating emission rates post-construction, site-specific meteorological data, and source- and site-specific modeling parameters.

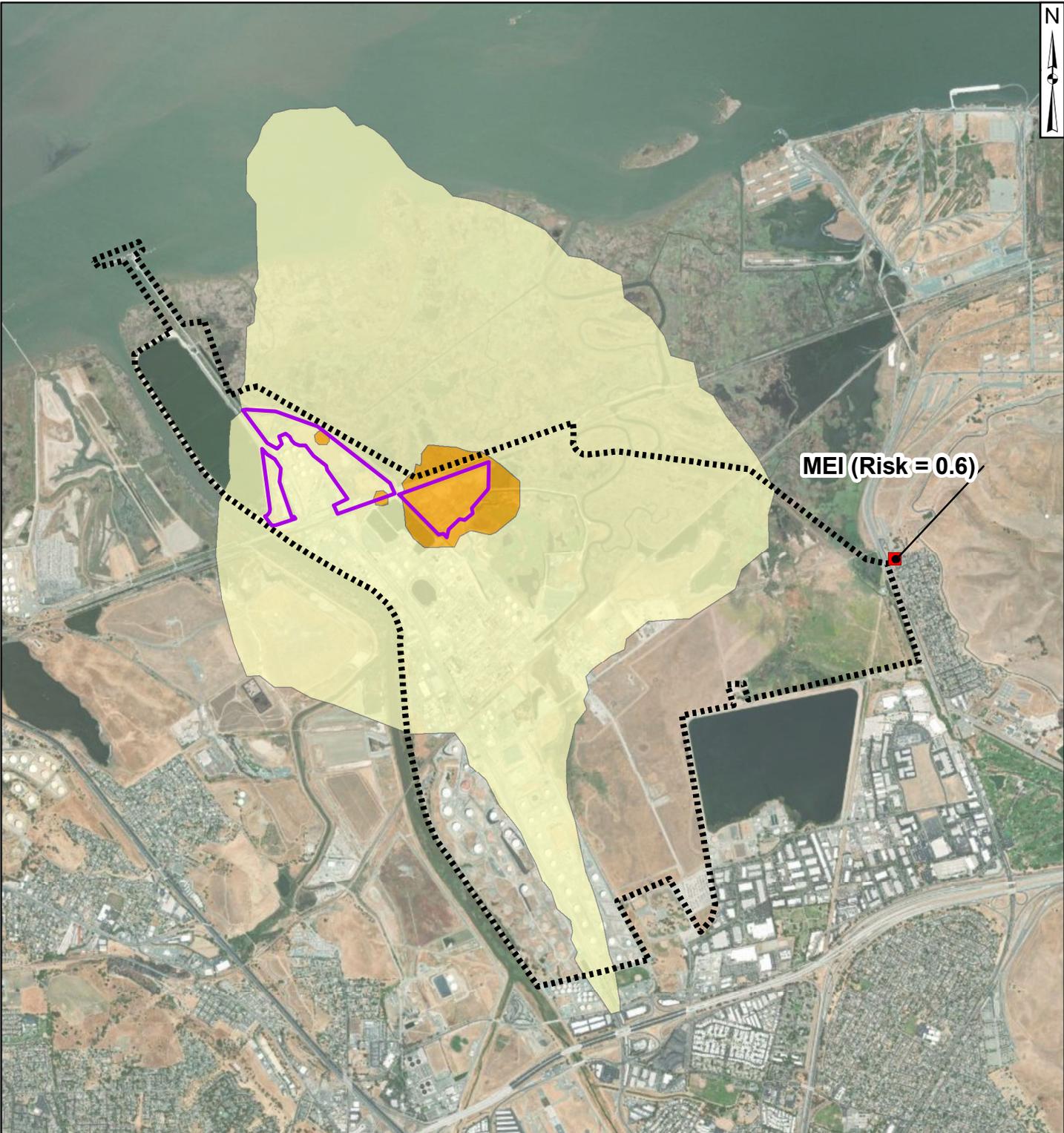
The average annual PM_{2.5} ground level concentration at a worker receptor location associated with the Project is calculated to be 0.08 µg/m³. The maximum Project cancer, chronic health, and acute health risk impacts at a receptor location are calculated to be 0.7 in one million, 0.01 hazard index, and 0.09 hazard index respectively. The Project's health risk impacts are below both CEQA significance and BAAQMD Rule 2-5-301, New Source Review for Toxic Air Contaminants, thresholds. Therefore, the Project's local community risk and hazard impacts from toxic air contaminants are insignificant for the purposes of CEQA review.

6.0 REFERENCES

BAAQMD, *Air Toxics NSR Program Health Risk Assessment Guidelines*, December 2016.

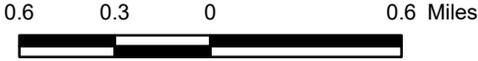
BAAQMD, *California Environmental Quality Act Air Quality Guidelines*, April 2022.

FIGURES



Legend

- MEI (Risk = 0.6)
- 1-10 Chances per Million
- > 10 Chances per Million
- Facility Property Boundary
- WMU Project Areas



**Marathon Martinez Renewable Fuels Facility
Residential Cancer Risk Results**



**Figure
1**

Martinez, CA

December 2023



Legend

- MEI (Risk = 0.7)
- 1-10 Chances per Million
- > 10 Chance per Million
- Facility Property Boundary
- WMU Project Areas



**Marathon Martinez Renewable Fuels Facility
Worker Cancer Risk Results**

Geosyntec
consultants

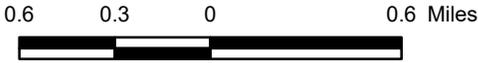
**Figure
2**



MEI (Risk = <0.01)

Legend

- MEI (Risk = <0.01)
- 0.2-1 Hazard Index
- >1 Hazard Index
- Facility Property Boundary
- WMU Project Areas



**Marathon Martinez Renewable Fuels Facility
Residential Chronic Health Risk Results**



**Figure
3**

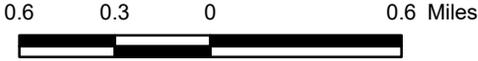
Martinez, CA

December 2023



Legend

- MEI (Risk = <0.01)
- 0.2-1 Hazard Index
- >1 Hazard Index
- Facility Property Boundary
- WMU Project Areas



**Marathon Martinez Renewable Fuels Facility
Worker Chronic Health Risk Results**



**Figure
4**



Legend

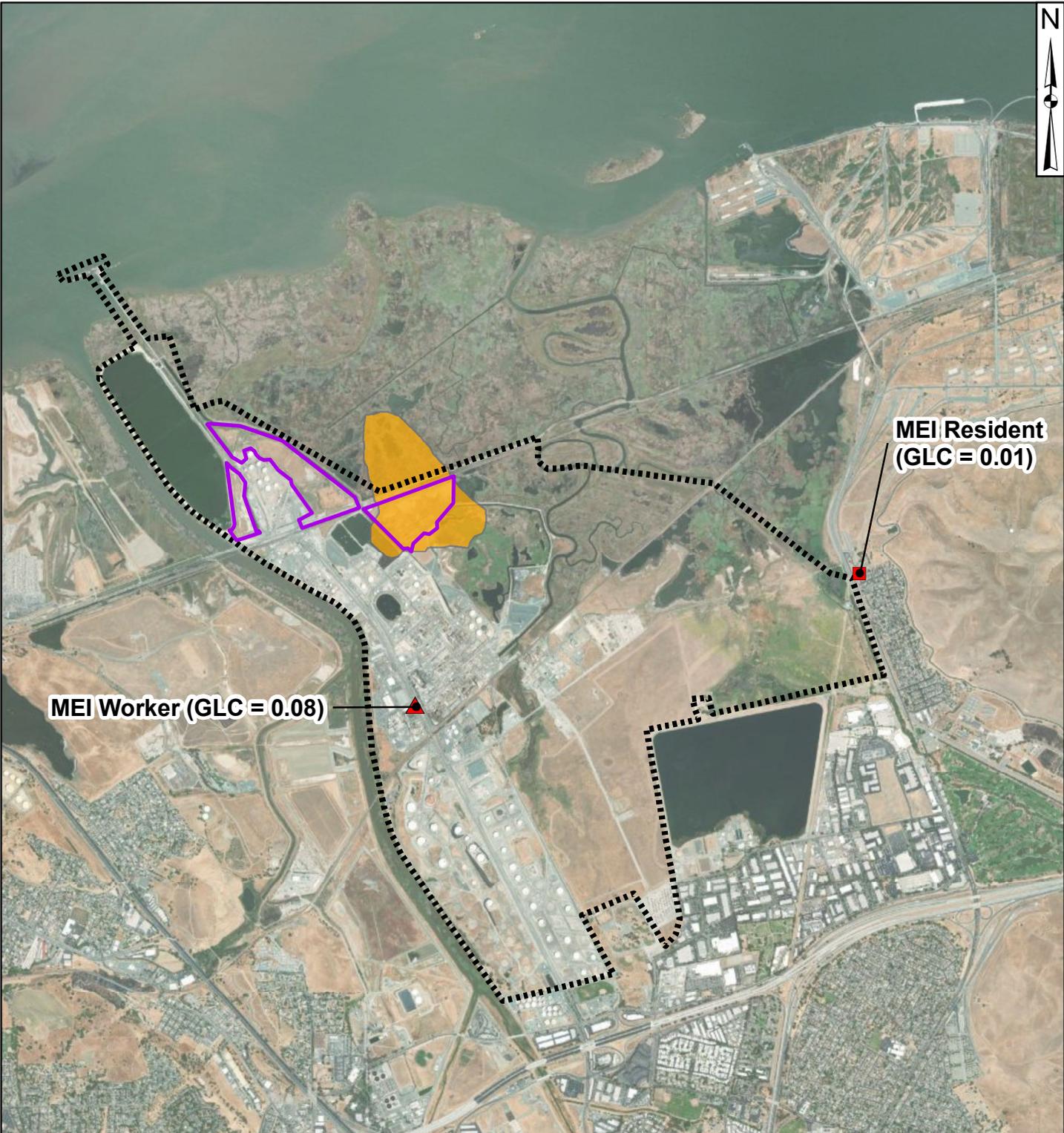
- MEI Resident (Risk = 0.01)
- ▲ MEI Worker (Risk = 0.09)
- >1 Hazard Index
- Facility Property Boundary
- WMU Project Areas



**Marathon Martinez Renewable Fuels Facility
Acute Health Risk Results**

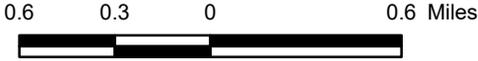


Figure
5



Legend

- MEI Resident ($0.01 \mu\text{g}/\text{m}^3$)
- ▲ MEI Worker ($0.08 \mu\text{g}/\text{m}^3$)
- $> 0.3 \mu\text{g}/\text{m}^3$
- ⋯ Facility Property Boundary
- WMU Project Areas



**Marathon Martinez Renewable Fuels Facility
PM2.5 Ground Level Concentration Results**

Geosyntec
consultants

Figure
6

Martinez, CA

December 2023

ATTACHMENT A
Health Risk Assessment Modeling Protocol

Prepared for

**Avon Remediation Team
1111 Broadway, 6th Floor
Oakland, California**

**MARATHON MARTINEZ
RENEWABLE FUELS FACILITY
WASTE MANAGEMENT UNIT
RESTORATION PROJECT
HEALTH RISK ASSESSMENT MODELING
PROTOCOL**

Prepared by

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Geosyntec Project Number HPA1145

December 2023

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Figure 3: Local Urban Characterization Map

Figure 4: Off-Site Worker and Residential Locations

Figure 5: Facility Wind Rose (2013 to 2017)

ATTACHMENTS

Attachment A: Project Toxic Air Contaminant Emissions Inventory

Attachment B: Emissions Source Modeling Parameters

LIST OF ABBREVIATIONS

AB	Assembly Bill
AERMOD	AMS/EPA Regulatory Model
ADMRT	Air Dispersion Modeling and Risk Tool
BAAQMD	Bay Area Air Quality Management District
BPIPPRM	Building Profile Input Program for PRIME
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
DPM	Diesel Exhaust Particulate Matter
EIM	Emissions Inventory Module
EMSOFT	Exposure Model for Soil-Organic Fate and Transport
GEP	Good Engineering Practice
HARP	Hot Spots Analysis and Reporting Program
HRA	Health Risk Assessment
ICE	Internal Combustion Engine
LFG	Landfill Gas
OEHHA	Office of Environmental Health Hazard Analysis
PM10	Particulate Matter 10 Micrometers or Less in Aerodynamic Diameter
RWQCB	Regional Water Quality Control Board
TAC	Toxic Air Contaminant
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds
WMU	Waste Management Unit

1.0 INTRODUCTION

The Avon Remediation Team is proposing completion of the Waste Management Unit (WMU) Restoration Project (Project) at the Marathon Martinez Renewable Fuels Facility (Facility) in Contra Costa County, California. The Project would involve the closure of inactive WMUs 10, 11, 14, 31, and 32 over a period of eight (8) years and mitigation and maintenance of the PROJECT WMUs. Maps outlining the Facility and Project boundaries are presented in Figure 1a and Figure 1b, provided as attachments to this document.

The Project is currently engaged in the review process per the California Environmental Quality Act (CEQA) to determine potential environmental impacts from planned operations. A preliminary draft Initial Study of Mitigated Negative Declaration (ISMND) is being prepared for the lead agency, the San Francisco Bay Regional Water Quality Control Board (RWQCB). This modeling protocol details the approach employed to estimate potential health risk impacts to the local community resulting from Project operations to supplement the broader CEQA review. The Project is located in the Bay Area Air Quality Management District (BAAQMD), and BAAQMD would serve as a responsible agency in review of the ISMND. This protocol is prepared in response to a request by BAAQMD's planning department to prepare an air quality health risk assessment (HRA) to supplement the analysis in the initial study. This HRA considers potential health risk impact associated with both toxic air contaminants (TACs) and particulate matter 2.5 micrometers or less in aerodynamic diameter (PM_{2.5}).

2.0 MODELING SOFTWARE

Air dispersion and health risk assessment modeling is performed using the Hot Spots Analysis and Reporting Program (HARP) software available from the California Air Resources Board (CARB). HARP was created to address the requirements of California Assembly Bill (AB) 2588, the Air Toxics “Hot Spots” Program, to identify facilities having localized health impacts and reduce significant risks to acceptable levels. However, HARP is also recommended for conducting health risk assessments associated with other programs, including CEQA reviews.¹

HARP is a multi-functional program which can be used to simulate the air dispersion of emissions and the health impacts associated with the calculated ground-level concentrations of toxic pollutants. To evaluate dispersion of air pollutants, HARP utilizes the AMS/EPA Regulatory Model (AERMOD). AERMOD is a steady-state gaussian plume model developed by the United States Environmental Protection Agency and American Meteorological Society that simulates the dispersion of air pollutants based on state-of-the-art modeling concepts.² To model associated health impacts, HARP incorporates the information presented in the 2015 Air Toxics Hotspots Program Guidance Manual for Preparation of Health Risk Assessments developed by the California Office of Environmental Health Hazard Analysis (OEHHA) (OEHHA HRA Manual).

The most recent version of each component of HARP, as of the beginning of this work effort in November 2023, was utilized and is presented in Table 2-1 below.

Table 2-1: HARP Version Information

HARP Component	Version
Emissions Inventory Module (EIM)	2.1.6
Air Dispersion Modeling and Risk Tool (ADMRT)	22118
Health Table	BAAQMD Approved ³
AERMOD	23132

¹ Information obtained from <https://ww2.arb.ca.gov/our-work/programs/hot-spots-analysis-reporting-program/about>, accessed November 10, 2023.

² Information obtained from <https://www.epa.gov/scram/air-quality-dispersion-modeling-preferred-and-recommended-models>, accessed November 10, 2023.

³ BAAQMD approved health table as saved in the ADMRT. Version number not available.

3.0 HRA EMISSIONS

An inventory of Project PM2.5 and TAC emissions was prepared for the worst-case emissions scenario under planned operating conditions.

The ISMND included emissions estimates of criterial air pollutants including, but not limited to, volatile organic compounds (VOC), particulate matter 10 micrometers or less in aerodynamic diameter (PM10), and PM2.5. PM2.5 emissions represented in this HRA are consistent with the PM2.5 emissions presented in the ISMND. TAC emissions were calculated based on the Project criteria pollutant emissions inventory. Additional information regarding TAC emissions calculations for each emission source category is provided in the following sections. PM2.5 and TAC emissions represented in this HRA account for any planned emissions mitigation techniques.

For each emission source category evaluated, the PM2.5 and TAC emissions included in the modeling inventory reflect the planned Project operating scenario(s) with the maximum hourly and annual emissions. The modeling therefore reflects the worst-case operating scenario emissions for all years. Therefore, the modeling results are considered a conservative representation of Project PM2.5 and TAC emissions and health risk impacts.

The modeled Project PM2.5 and TAC emissions inventory is presented in Attachment A to this document.

3.1 Diesel Internal Combustion Engines

Diesel internal combustion engines (ICEs) have the potential to emit PM2.5 and TACs. Diesel particulate matter (DPM) is a toxic pollutant identified by OEHHA which accounts for the total cancer and chronic health effects from inhalation of diesel exhaust. For this analysis, emissions of DPM are estimated to be equivalent to emissions of PM10, which is considered a representative assessment of Project TAC emissions for health risk assessment.

PM2.5 and PM10 emissions from diesel ICEs were quantified in the ISMND. The PM2.5 and PM10 emissions from diesel ICEs presented in the ISMND were estimated using the CARB EMFAC database. The highest PM2.5 and PM10 emissions rates for diesel ICEs are estimated to occur during the eighth year of Project operations. Emissions of PM2.5 and DPM by modeled engine category are presented in Table 3-1 below. Modeled engine categories are described in more detail in section 4.1 below.

Table 3-1: Modeled DPM Emissions by Engine Category

Modeled Engine Category	PM2.5 Emissions		DPM Emissions	
	lb/hr	lb/yr	lb/hr	lb/yr
Diesel Construction Equipment (Small) ⁴	-	-	-	-
Diesel Construction Equipment (Large) ⁵	0.05	53.28	0.06	57.60
Diesel Support Equipment (Small) ⁶	0.04	22.16	0.05	24.22
Diesel Support Equipment (Large) ⁷	0.03	35.16	0.03	41.97
Diesel Portable Equipment (Small) ⁸	0.09	120.38	0.09	120.38
Diesel Portable Equipment (Large) ⁹	0.01	22.06	0.01	22.06

3.2 Gasoline Internal Combustion Engines

Gasoline ICEs have the potential to emit PM2.5 and TACs. Gasoline ICE sources associated with the Project include personal vehicle exhaust associated with employee commutes, light duty work truck exhaust, and evaporative losses from work vehicles.¹⁰ For the purposes of this evaluation, emissions from personal vehicles are not included. The Project is located within the Facility, which is a major industrial site where the total count of on-site workers varies day to day. The increased emissions associated with employee commutes to the Facility for the Project are assumed to be insignificant relative to the existing commute emissions and Project construction and operational emissions.

PM2.5, PM10, and VOC emissions from gasoline ICEs were quantified in the ISMND using the CARB EMFAC database. The highest PM2.5, PM10, and VOC emissions rates for gasoline ICEs are estimated to occur during the third year of Project operations. To estimate TAC emissions from gasoline exhaust, toxic speciation profiles for PM10 and VOC emissions are derived using default criteria and toxic pollutant emission factors from the South Coast Air Quality Management District (SCAQMD).¹¹ TAC emissions from Project gasoline ICEs were characterized using the emission factors for portable catalytic gasoline ICEs.

VOC emissions from gasoline ICE evaporative losses are speciated using gasoline vapor concentration data provided in Table A-2 of Appendix A to the United States Environmental Protection Agency's (USEPA's) Emissions Estimation Protocol for Petroleum Refineries, dated April 2015.

⁴ Small construction equipment includes equipment such as skid steers and asphalt compactors.

⁵ Large construction equipment includes equipment such as excavators and loaders.

⁶ Small support equipment includes equipment such as utility vehicles and forklifts.

⁷ Large support equipment includes equipment such as water trucks and telehandlers.

⁸ Small portable equipment includes equipment such as small generators and pumps.

⁹ Large portable equipment includes equipment such as large generators.

¹⁰ Gasoline ICE evaporative losses include emissions from start, hot soak, run loss, rest loss, and diurnal processes.

¹¹ Criteria emission factors obtained from the SCAQMD Default Combustion Emission Factors (Revised January 2022). TAC emission factors obtained from the SCAQMD AB 2588 Quadrennial Air Toxics Emissions Inventory Reporting Procedures (June 2020).

3.3 Construction Fugitive Dust

Construction operations have the potential to emit PM_{2.5} and TACs as fugitive dust. Fugitive dust sources associated with the Project include construction activities (e.g. bulldozing, disturbed surfaces, cement usage, and storage piles). PM_{2.5} and PM₁₀ emissions from fugitive dust sources were quantified in the ISMND. The highest PM_{2.5} and PM₁₀ emissions rates for different construction activities occurred during different years of operation. Conservatively, the maximum emission rates for each construction activity are considered.

The PM₁₀ emissions are speciated to account for the presence of metal TACs in fugitive dust emissions. Maximum hourly TAC emissions are estimated by applying the maximum soil concentration of each TAC from available sampling results from all WMUs to the PM₁₀ emissions. Annual emissions are estimated by applying the highest average soil concentration of each TAC from available sampling results from all WMUs to the PM₁₀ emissions.

3.4 Waste Management Unit Exposure

WMUs have the potential to emit TACs when contaminated material is exposed to atmosphere. TAC emissions from WMU exposure are associated with the volatilization of toxic constituents from excavation areas, storage piles, etc. TAC emissions from WMU exposure are calculated using the USEPA Exposure Model for Soil-Organic Fate and Transport (EMSOFT; Version 2.01, September 2002), which estimates the volatilization rates of constituents contained within soil based on the physical and chemical properties of the material. Hourly and annual TAC emissions are estimated for each operating year by applying the average soil concentrations of volatile and semi-volatile TACs from available sampling results for the WMUs planned to be active in that operating year. Average sampling results were utilized to characterize hourly and annual emissions as exposed areas at any given time are anticipated to contain materials with varying TAC concentrations. The highest TAC emission rate from WMU exposure is estimated to occur during the third year of Project operations.

3.5 Haul Roads

Off- and on-site haul roads will be utilized to mobilize equipment to the Project site and transport materials within the Project site. Haul roads have the potential to emit PM_{2.5} and TACs. Potential haul road PM_{2.5} emissions are associated with resuspension of particulate emissions from paved and unpaved roads as well as vehicle exhaust. Potential haul road TAC emissions are associated with vehicle exhaust and are characterized as DPM with emissions equivalent to haul truck PM₁₀ emissions.

PM_{2.5} and PM₁₀ emissions associated with haul roads were quantified in the ISMND. The PM_{2.5} and PM₁₀ emissions from haul roads and haul trucks presented in the ISMND were estimated using guidance from USEPA and the CARB EMFAC database, respectively. The highest PM_{2.5} and PM₁₀ emissions rates associated with on-site haul roads and off-site haul roads occurred during different years of operation. Conservatively, the maximum emission rates for each haul road source are considered.

3.6 Landfill Gas System

The landfill gas (LFG) system is anticipated to be constructed as part of the final closure of WMU 14 and is anticipated to operate continuously after completion of Project construction activities. The LFG system is not anticipated to be a source of emissions during Project construction but will be a long-term emissions source thereafter. In Year 6, WMU 14 is capped with a low-permeability cover and LFG system to allow for off gassing. TAC emissions from the LFG system are calculated using the design flowrate of 26.7 standard cubic feet per minute and assumed to be equivalent to Year 6 volatile emissions from WMU 14 since any potential volatile emissions from WMU 14 may be emitted from the LFG system after capping.

3.7 WMU 32 Operational Emissions

At WMU 32, a cover is anticipated to be installed after completion of Project activities. Any gas generated below the cover would be passively emitted from the unit perimeter through the geotextile layer. However, the gas generation rate from WMU 32 will remain unchanged from present after the Project completion. Health risks from the WMU 32 gas generation are not being modeled because there is no risk change between the start and completion of the Project.

4.0 EMISSIONS SOURCE MODELING PARAMETERS

Emissions sources for air dispersion modeling are defined using the EIM program of HARP. Detailed modeling parameters for emissions sources are summarized below and are presented in Attachment B to this document. Emissions source locations are presented in Figure 2, provided as an attachment to this document.

Construction emissions may be generated at multiple locations within the active WMU(s) simultaneously, and the active WMU(s) change over the course of the Project. Therefore, specific locations of construction emissions sources are not able to be modeled. For this assessment, construction emissions sources are modeled as occurring within WMU 10 for the entire duration of Project construction activities. WMU 10 was chosen as a conservative location to represent Project emissions, as it is located relatively close to the nearest residential (Clyde community) and worker (on-site property leased by Air Products) receptor locations to the site. Additional information regarding receptor information is provided in section 5.3 below.

4.1 Diesel Internal Combustion Engines

Diesel ICEs, except haul trucks (discussed in section 4.5 below) are modeled as horizontal stacks, as exhaust pipes for portable and mobile equipment are typically either horizontal or capped to prevent rain or debris from entering. The use of horizontal stacks in the modeling analysis accounts for plume buoyancy due to elevated temperature, compared to ambient temperature, while not including additional plume rise resulting from an initial vertical exit velocity. The EIM does not contain functionality to model horizontal stacks directly, therefore the emissions sources were modeled as point sources using effective stack diameters and exit velocities for horizontal stacks per the USEPA User's Guide for the AMS/EPA Regulatory Model (AERMOD), dated April 2021 (AERMOD User's Guide). Per the AERMOD User's Guide, a negligible exit velocity of 0.2 feet per minute is modeled to account for suppression of vertical momentum. An effective diameter is calculated to maintain the actual flowrate so that the buoyancy of the plume and its effect on pollutant dispersion is accurately considered.

For modeling purposes, diesel ICEs were grouped into six (6) categories for determining representative release parameters, as presented in Table 4-1 below. Diesel ICEs were categorized based on similar function, horsepower, and estimated release height. Emissions from diesel ICEs are modeled as one (1) horizontal stack per engine category in the center of WMU 10.

Diesel ICEs related to construction activities are assumed to be best characterized as point sources to account for plume temperature buoyancy. Many engines are assumed to operate predominantly while stationary, for auxiliary power. For construction equipment in motion, the effects of traffic-induced turbulence are assumed to be insignificant compared to plume buoyancy due to the compact design of construction equipment, minimal travel distances, and slow speeds within active construction areas.

Table 4-1: Diesel ICE Representative Parameters

Diesel ICE Category	Representative Horsepower ¹²	Reference Engine ¹³	Exhaust Temperature	Exhaust Flowrate
			°F	CFM
Construction Equipment (Small)	75	Cummins 4B3.9	1,050	419
Construction Equipment (Large)	175	Cummins C-180	900	881
Support Equipment (Small)	50	Cummins 3B2.9	1,000	311
Support Equipment (Large)	475	Cummins ISX	842	2,504
Portable Equipment (Small)	10	HATZ E780	1,100	72
Portable Equipment (Large)	300	Cummins 6CT	1,000	2,140

4.2 Gasoline Internal Combustion Engines

Exhaust emissions from light duty gasoline work trucks are characterized as a horizontal stack in the center of WMU 10, similar to the approach taken for diesel ICEs. Gasoline exhaust parameters assume an engine size of 300 horsepower and are based on the parameters for a Cummins 6CT engine of 1,000°F and 2,140 cubic feet per minute.

Emissions from gasoline ICEs also include evaporative losses from the fuel tanks associated with work vehicles. Evaporative emissions are modeled as a volume source located in the center of WMU 10. The plume dimensions are based on the approximate dimensions of a Ford F-150 to represent a typical gasoline work vehicle.

4.3 Fugitive Dust

Construction fugitive dust emissions are modeled as a volume source located in the center of WMU 10. To represent active construction operations with heavy machinery, the plume dimensions are based on the dimensions of a typical haul truck provided in the USEPA Haul Road Workgroup Recommendations, dated November 2011 (USEPA Haul Road Recommendations).

4.4 Waste Management Unit Exposure

Emissions from WMU exposure are anticipated to be emitted at near-ground level with negligible plume buoyancy. Utilizing area sources is a representative approach to characterize the emissions plume from such sources. However, the processing demand to model an area source scales with the size of the area modeled. Due to the potentially large footprints of active work areas, characterizing WMU exposure emissions as area sources is impractical due to the increased processing demand and model runtime. To reduce processing demand, these sources were instead modeled as point sources, with “pseudo-point source” release parameters. Pseudo-point sources intend to characterize the emissions plume similar to an area source, with no vertical release

¹² Representative horsepower determined based on the average horsepower for categories with a large range of equipment sizes, or mode horsepower for categories with predominantly one engine size.

¹³ Information obtained from the Donaldson Filtration Solutions Engine Exhaust Flow & Air Consumption Guide. Reference engines were chosen

velocity nor thermal buoyancy, by modeling the point sources with zero exit velocity and ambient stack exit temperature.

The highest TAC emission rate from WMU exposure is estimated to occur during the third year of Project operations. During this year, WMUs 14 and 31 are anticipated to have active construction and exposed contaminated material. Therefore, the WMU exposure emissions associated with WMUs 14 and 31 are each modeled as one (1) pseudo-point source located in the center of the respective WMU.

Potential TAC emissions TAC emissions associated with WMUs 10, 11, and 32 were calculated and determined to be less than the potential TAC emissions associated with WMUs 14 and 31 during the third year of Project operations. Therefore, only emissions from WMUs 14 and 31 are included in the model to conservatively represent worst-case conditions from WMU exposure for all eight (8) years of construction activities.

4.5 Haul Roads

Emissions from haul trucks include both fugitive emissions from road dust and vehicle exhaust emissions. Due to the large size, and relatively fast speeds of haul trucks compared to construction equipment, the effect of vehicle-induced turbulence on haul truck exhaust emissions is assumed to be significant. This turbulence effect is assumed to result in a well-mixed plume of road dust and vehicle exhaust during haul truck operation. Therefore, emissions from both road dust and vehicle exhaust are included together in one (1) source for air dispersion modeling.

Emissions from off-site and on-site haul roads are characterized as line sources, consistent with the USEPA Haul Road Recommendations. The volume source parameters are based on the typical haul truck dimensions provided in the recommendations and assuming a two-lane road width of 25 feet. Please note, the EIM program of HARP does not yet contain the functionality to model line sources. The ADMRT program of HARP does include this functionality. Therefore, haul road sources are modeled directly in the ADMRT and were not included in the EIM model set up.

Off-site haul roads are characterized using three (3) line sources to represent a haul route extending from Highway 4 into the main gate of the Facility, then utilizing Solano Way and Waterfront Road to access the WMU 14 area. Total off-site haul road emissions are divided between each line source proportionally based on distance.

On-site haul roads are characterize using one (1) line source extending from the center of WMU 10 to the center of WMU 14 to represent material transfer between the work areas.

4.6 Landfill Gas System

The LFG system is modeled as one (1) point source located in the center of WMU 14. A maximum effluent flowrate of 26.7 standard cubic feet per minute is assumed based on preliminary design information. Engineering assumptions were used to characterize the remaining stack parameters for the LFG system as other parameters are currently not available in the preliminary design.

5.0 AIR DISPERSION MODELING PARAMETERS

Air dispersion modeling is performed using the ADMRT to estimate ground level concentrations of PM_{2.5} and TAC emissions resulting from the Project emissions sources.

5.1 Urban Option

A land use assessment for the modeling domain was performed using the procedure defined in section 4.4.1.1 of the OEHHA HRA Manual. Per this procedure, the land uses in the area circumscribed by a three (3)-kilometer radius circle centered at the modeled source is analyzed. If 50 percent or more of the area is categorized as an urban land use, the urban dispersion option is appropriate. Urban land uses include industrial, commercial, and residential areas. Non-urban land uses include undeveloped land, parks, golf courses, and water surfaces.

Less than 25 percent of the area analyzed is categorized as urban land use. Therefore, the urban option is not included in this modeling assessment. The areas categorized as urban land use are presented in Figure 3, provided as an attachment to this document.

5.2 Variable Emissions

It is assumed that construction sources will operate only between 5 AM and 5 PM. Emissions from WMU exposure and the LFG system are assumed to be continuous.

5.3 Receptors

Modeling is performed using the following receptors, consistent with the recommendations of the BAAQMD Health Risk Assessment Modeling Protocol, dated December 2020 (BAAQMD HRA Modeling Protocol):

- Fenceline receptors, spaced 20 meters;
- Off-site receptors out to 200 meters from the property boundary, spaced 25 meters;
- Off-site receptors between 200 and 500 meters from the property boundary, spaced 50 meters;
- Off-site receptors between 500 and 2,000 meters from the property boundary, spaced 100 meters; and
- Receptors located at on-site properties owned or leased by other entities (characterized as worker receptors for this assessment).

Additional receptors are modeled for information purposes, to characterize the Project's zone of impact, and to generate risk isopleths:

- A uniform cartesian grid of off-site receptors surrounding the site, extending 14,000-meter east/west by 15,500-meter north/south, spaced 250 meters;
- On-site receptors, spaced 100 meters; and
- Discrete receptors located at nearby schools, as detailed in Table 5-1 below.

Table 5-1: Discrete School Receptors

Location Name	Address	Modeled Coordinates	
		Easting (m)	Northing (m)
Las Juntas Elementary School	4105 Pacheco Blvd Martinez, CA 94553	579,775	4,207,270
Morello Park Elementary School	1200 Morello Park Dr Martinez, CA 94553	579,208	4,206,469
Sun Terrace Elementary School	2448 Floyd Ln Concord, CA 94520	585,105	4,206,476
Sun Terrace Pre-School	3585 Port Chicago Hwy Concord, CA 94520	585,374	4,206,378
Mariah's Daycare	2437 Floyd Ln Concord, CA 94520	585,135	4,206,281

Receptor locations are identified in Figure 4, provided as an attachment to this document. Receptors are modeled with a flagpole height of 1.5 meters to approximate an average human breathing zone, consistent with the recommendations of the BAAQMD HRA Modeling Protocol.

5.4 Meteorology

Meteorology at the Project location may be characterized by meteorological data collected at an on-site or off-site location. The USEPA recommends the use of at least one (1) year of site-specific meteorological data or five (5) years of adequately representative off-site data.

Site-specific AERMOD-ready meteorological data is available from the Facility's on-site meteorological station for 2013 through 2017. The site-specific meteorological data is considered the most representative data to characterize Project air dispersion. Air dispersion modeling is performed using five (5) years of site-specific data from 2013 through 2017. A wind rose for the meteorological data used is presented in Figure 5, provided as an attachment to this document.

5.5 Terrain

The terrain in the modeling domain is characterized using digital elevation model information provided by CARB, per HARP recommendations. The Project modeling domain is encompassed by the Benicia, Briones Valley, Clayton, Honker Bay, Vine Hill, and Walnut Creek digital elevation model files.

5.6 Building Downwash

Building downwash effects can be estimated in AERMOD using the Building Profile Input Program for PRIME (BPIPPIRM). BPIPPIRM is a program designed to incorporate the concepts of Good Engineering Practice (GEP) stack height and building downwash to characterize buildings for air dispersion modeling from point sources; BPIPPIRM and AERMOD do not contain functionality to estimate building downwash effects from non-point sources. Building downwash effects are modeled for point sources within a building's GEP 5L area of influence, where L is

defined as the lesser dimension of the building height or projected building width in each direction (USEPA, 1995).

A preliminary evaluation of the nearest buildings to the modeled Project point sources was performed and resulted in a maximum GEP 5L distance of 110 meters from nearby structures. The point sources defined above are located at a minimum distance of approximately 165 meters from the nearest buildings. The point sources are located at a distance greater than the maximum GEP 5L from nearby structures, therefore building downwash effects are not included in this air dispersion model.

6.0 HEALTH RISK MODELING PARAMETERS

Potential health risk impacts associated with Project emissions are calculated using the risk analysis functionality of the ADMRT. Potential cancer, chronic health, and acute health risk impacts for both residents and workers are calculated based on the air dispersion modeling ground level concentration results.

6.1 Exposure Scenarios

Cancer, chronic health, and acute health risk impacts for both residential and worker exposure will be assessed. Per the BAAQMD Air Toxics NSR Program Health Risk Assessment Guidelines, dated December 2016 (BAAQMD HRA Guidelines), cancer risks associated with short-term construction sources will be evaluated based on an exposure duration of eight (8) years, which corresponds to the duration of construction activities. Cancer risks associated with the LFG system will be evaluated based on a total receptor exposure duration of 30 years and 25 years for residential and worker exposure respectively in accordance with the OEHHA HRA Manual. Per the OEHHA HRA Manual, the residential exposure duration for cancer risk will begin during the third trimester of pregnancy and the worker exposure duration will begin at the age of 16. Due to a two year overlap for construction activities and LFG system operation (Years 7 and 8), the operation activity residential exposure duration of the LFG system is 24 years starting from age 6; the worker exposure duration is 19 years starting from age 22. Chronic health and acute health risk impacts will be evaluated using the default parameters in HARP, as these are unable to be overridden.

6.2 Intake Rates

Per the BAAQMD HRA Guidelines, calculations for residential cancer risk from short-term construction emissions will conservatively utilize the 95th percentile intake rates. Calculations for long-term residential cancer risk from LFG system emissions will utilize a combination of the 95th percentile and 80th percentile intake rates (RMP using the Derived Method). Non-cancer residential health risks will utilize a combination of the 95th percentile and 65th percentile intake rates (OEHHA Derived Method).

Calculations for worker exposure will utilize the 95th percentile intake rates for all Project emission sources.

6.3 Exposure Pathways

Health risk impacts will be analyzed based on the mandatory minimum pathways defined in the OEHHA HRA Manual including inhalation, soil ingestion, dermal exposure, and breast milk consumption. The residential receptors near the Project are located on suburban housing communities, therefore additional exposure pathways, such as ingestion of surface water or home-raised animal products, are not considered to be representative.

Inhalation exposure will account for a residential fraction of time at home of 0.73 for persons over the age of 16 per the OEHHA HRA Manual. Consistent with BAAQMD HRA Guidelines, a fraction of time at home of 1.00 will initially be assumed for persons under the age of 16. If no

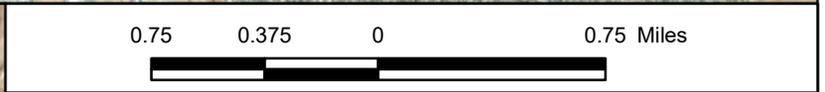
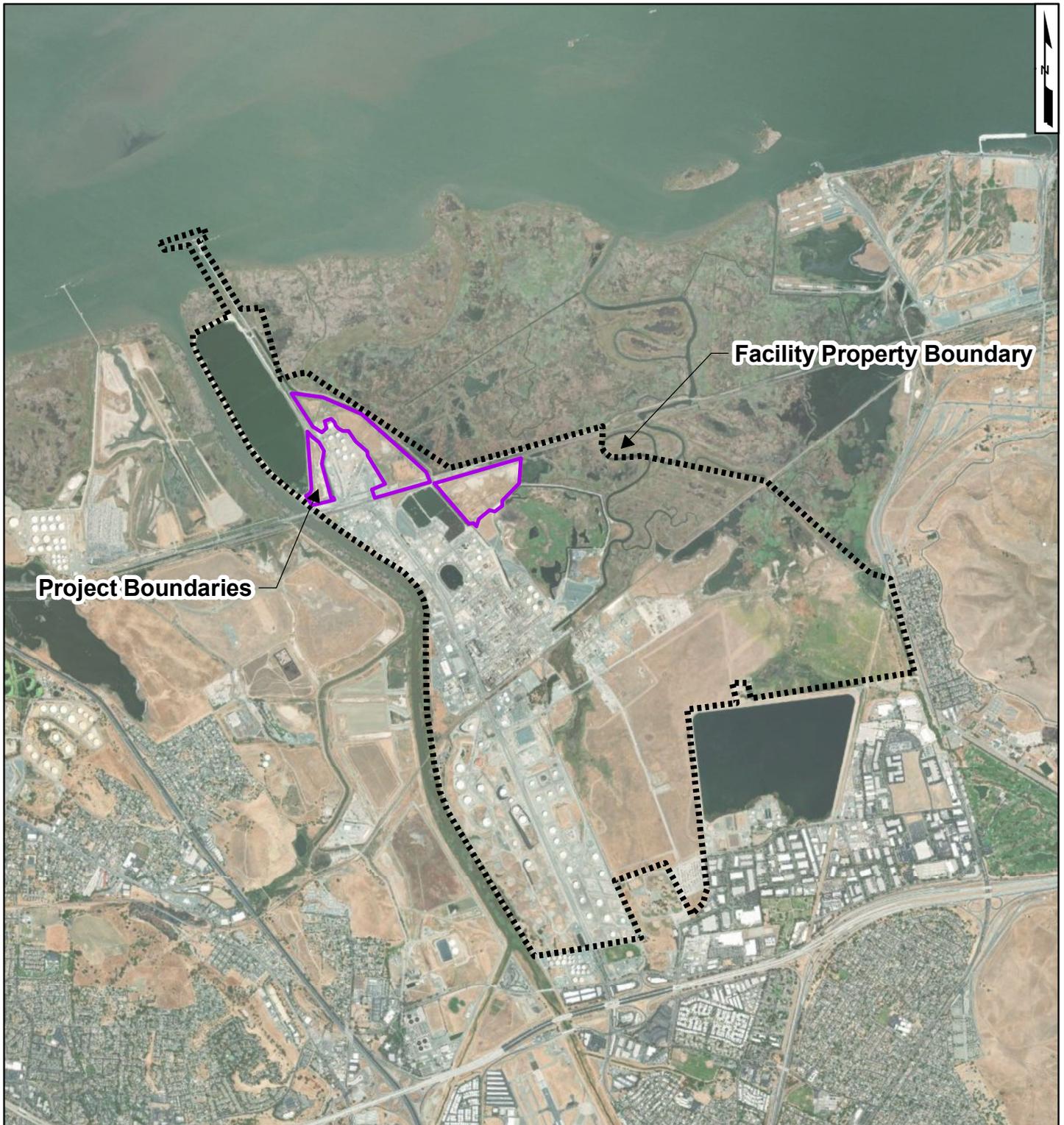
schools are exposed to a cancer risk of one in a million or greater, this assumption will be refined to 0.85 for individuals less than two (2) years old, and 0.72 for individuals between two (2) and 16 years old. Worker inhalation exposure is characterized using the default 8-hour breathing rates for moderate intensity activities per HARP recommendation. A worker adjustment factor of 2.0 is used based on the maximum source operating schedule accounted for in modeling of 12 hours per day and seven (7) days per week per the OEHHA HRA Manual. A discount factor was not applied when calculating the worker adjustment factor.

Non-inhalation pathways will be estimated based on a deposition rate of 0.02 meters per second. Per the OEHHA HRA Manual, dermal exposure in the San Francisco area is characterized by a cold climate. Soil and breast milk ingestion are characterized using the default parameters in HARP.

7.0 REFERENCES

- BAAQMD, *Health Risk Assessment Modeling Protocol*, December 2020.
- BAAQMD, *California Environmental Quality Act Air Quality Guidelines*, April 2022.
- BAAQMD, *Air Toxics NSR Program Health Risk Assessment Guidelines*, December 2016.
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- USEPA, *Memorandum: Haul Road Workgroup Final Report*, December 6, 2011
- USEPA, *User's Guide to the Building Profile Input Program*, February 8, 1995.

FIGURES



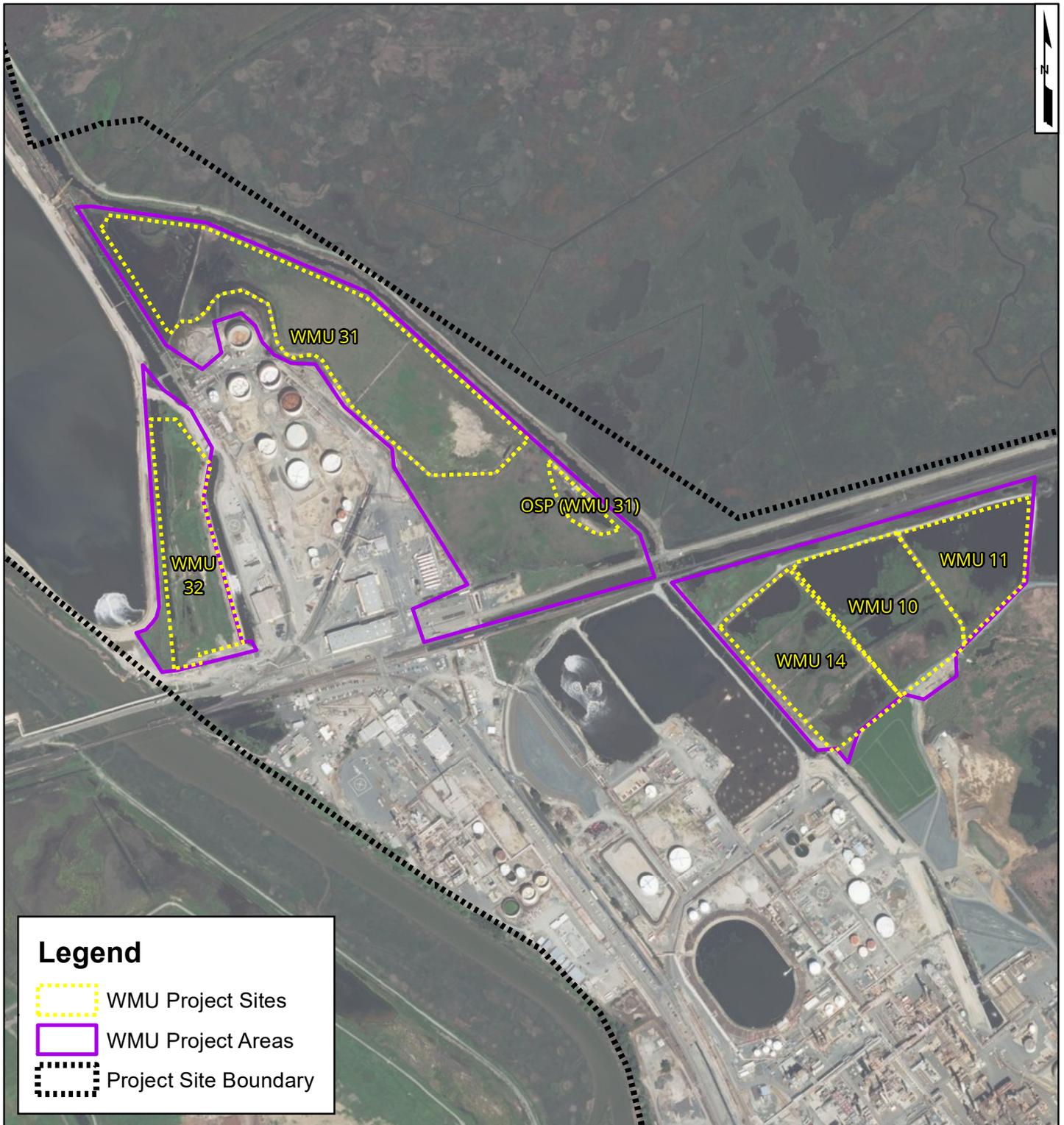
**Waste Management Unit Restoration Project
Facility Property Boundary and
Project Boundaries**

Geosyntec 
consultants

**Figure
1a**

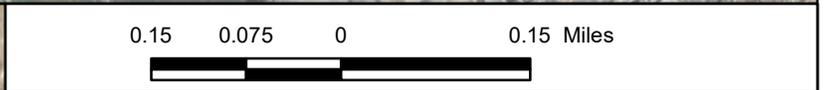
Martinez, CA

December 2023



Legend

- WMU Project Sites
- WMU Project Areas
- Project Site Boundary



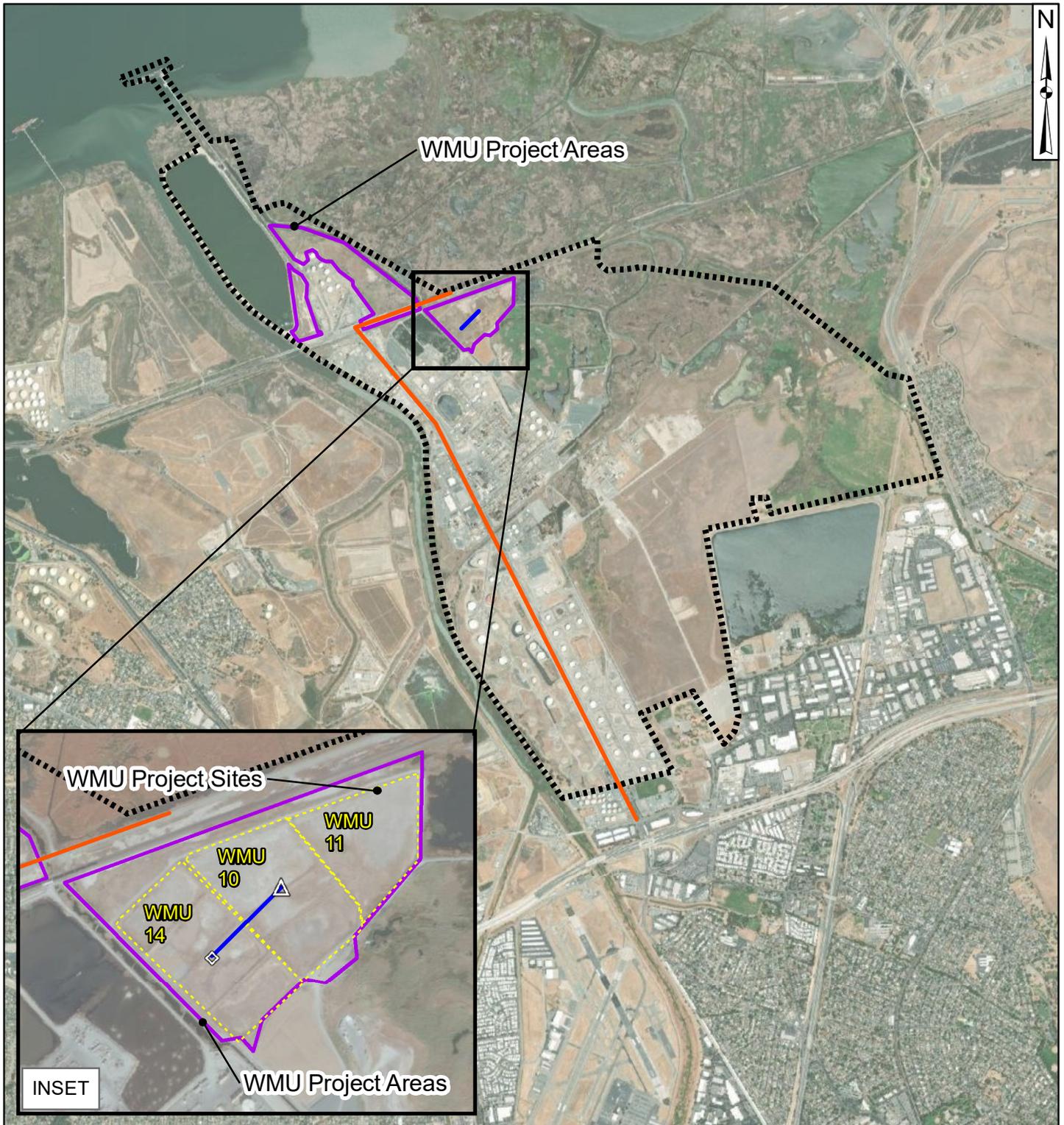
**Waste Management Unit Restoration Project
Facility Property Boundary and Project
Boundaries**

Geosyntec
consultants

**Figure
1b**

Martinez, CA

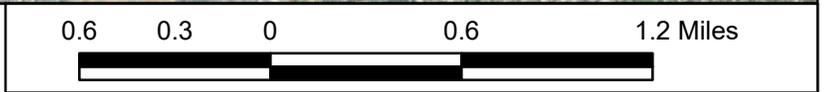
December 2023



Project Site Boundary

Emission Points

- Diesel ICEs, Gasoline ICEs, Fugitive Dust, and WMU 10 Exposure
- WMU 14 Exposure and LFG System Operation
- Haul Road Line Source
- Construction Trucks Line Source



**Waste Management Unit Restoration Project
Emissions Source Locations**

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**Figure
2**

Martinez, CA

June 2022



Legend

- Model Radius
- Urban Areas

0.75 0.375 0 0.75 Miles



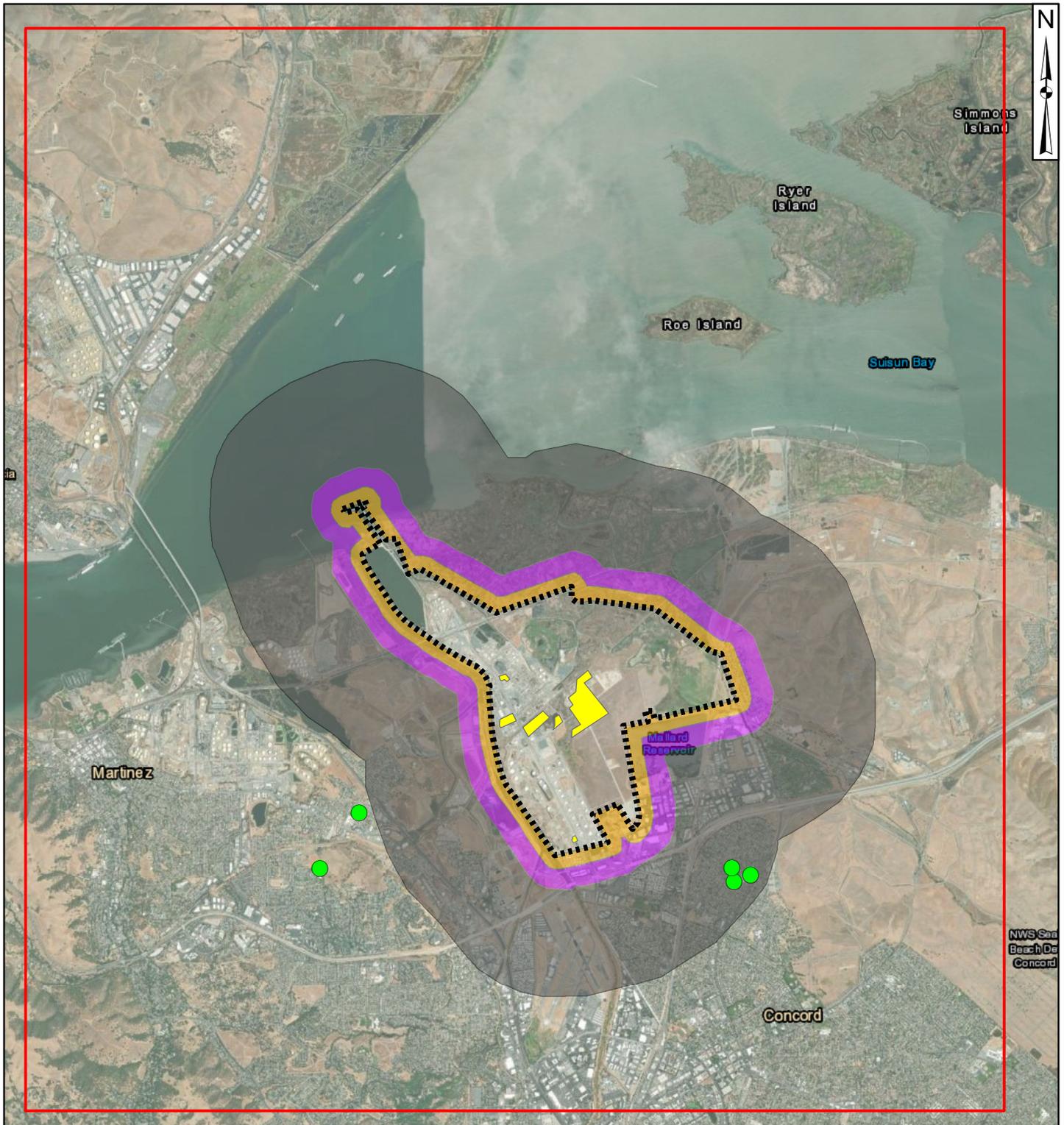
**Waste Management Unit Restoration Project
Local Urban Characterization Map**

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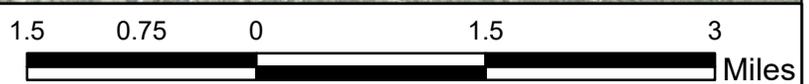
Figure
3

Martinez, CA

June 2022



-  Project Site Boundary
-  Modeling Domain Grid
-  On-Site Worker Receptors
-  25-meter Receptors
-  50-meter Receptors
-  100-meter Receptors
-  School Receptors



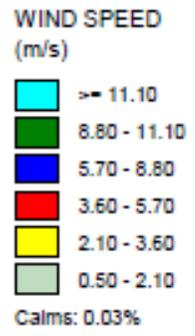
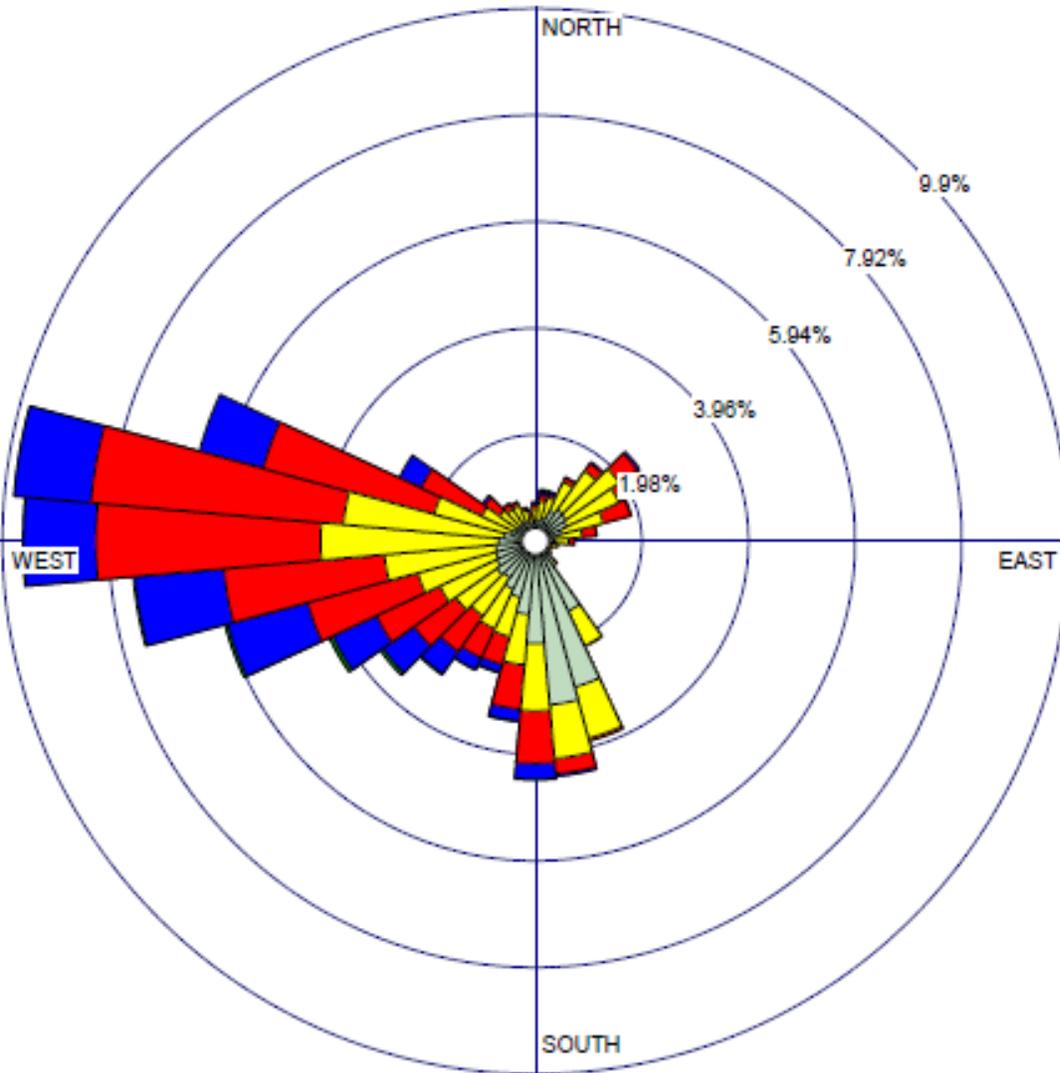
**Waste Management Unit Restoration Project
Receptor Locations**

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Figure
4

Martinez, CA

June 2022



**Waste Management Unit Restoration Project
Facility Wind Rose
(2013 to 2017), Station #23254**



Figure
5

Martinez, CA

November 2023

ATTACHMENT A
Project Toxic Air Contaminant Emissions Inventory

ATTACHMENT B
Emissions Source Modeling Parameters

Emissions Source Modeling Parameters for the Waste Management Unit Restoration Project

Source Description		Diesel Construction Equipment (Small)	Diesel Construction Equipment (Large)	Diesel Support Equipment (Small)	Diesel Support Equipment (Large)	Diesel Portable Equipment (Small)	Diesel Portable Equipment (Large)	Gasoline Equipment	Gasoline Evaporation	Construction Fugitive Dust	WMU 10 Volatiles	WMU 11 Volatiles	WMU 14 Volatiles	WMU 31 Volatiles	WMU 32 Volatiles	LFG System Effluent	On-Site Haul Roads	Off-Site Trucks - First Length	Off-Site Trucks - Second Length	Off-Site Trucks - Third Length
Modeling Designation		DICE_CONST_S	DICE_CONST_L	DICE_SUPP_S	DICE_SUPP_L	DICE_PORT_S	DICE_PORT_L	GICE_EXH	G_EVAP	CONST_DUST	WMU_10	WMU_11	WMU_14	WMU_31	WMU_32	LFG_EFFLUENT	HR	CONST_TRUCK_S_1	CONST_TRUCK_S_2	CONST_TRUCK_S_3
DEV ID		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Source Type		Point (Horizontal)	Point (Horizontal)	Point (Horizontal)	Point (Horizontal)	Point (Horizontal)	Point (Horizontal)	Point (Horizontal)	Volume	Volume	Point (pseudo)	Point	Volume (Line)	Volume (Line)	Volume (Line)	Volume (Line)				
Source Locations - UTM WGS84 Coordinates and Elevations																				
Origin ^(a)	Easting (m)	581,996	581,996	581,996	581,996	581,996	581,996	581,996	581,996	581,996	581,996	582,147	581,883	581,102	580,778	581,878	581,996	583,073	581,698	581,125
	Northing (m)	4,210,006	4,210,006	4,210,006	4,210,006	4,210,006	4,210,006	4,210,006	4,210,006	4,210,006	4,210,006	4,210,095	4,209,900	4,210,367	4,210,040	4,209,885	4,210,006	4,206,504	4,209,230	4,209,867
	Elevation (m) ^(c)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
End Point ^(b)	Easting (m)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	581,878	581,698	581,125	581,810
	Northing (m)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	4,209,885	4,209,230	4,209,867	4,210,121
	Elevation (m) ^(c)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	1	1	1	1
Source Parameter References and Assumptions																				
Stack Height (ft) ^(d)		7.0	9.2	1.0	9.2	6.4	12.7	0.8	--	--	0.0	0.0	0.0	0.0	0.0	13.0	--	--	--	--
Stack Diameter (ft) ^(e)		--	--	--	--	--	--	--	--	--	0.0	0.0	0.0	0.0	0.0	0.3	--	--	--	--
Horizontal Stack Exit Velocity (m/s) ^(d)		0.001	0.001	0.001	0.001	0.001	0.001	0.001	--	--	--	--	--	--	--	--	--	--	--	--
Effluent Temperature (°F) ^(g)		1,050	900	1,000	842	1,100	1,000	1,000	--	--	--	--	--	--	--	--	--	--	--	--
Effluent Flowrate (cfm) ^{(g)(h)}		419	881	311	2,504	72	2,140	2,140	--	--	0.0	0.0	0.0	0.0	0.0	26.7	--	--	--	--
Volume Source Reference Height (ft) ⁽ⁱ⁾		--	--	--	--	--	--	--	6	10	--	--	--	--	--	--	10	10	10	10
Volume Source Reference Width (ft) ⁽ⁱ⁾		--	--	--	--	--	--	--	25	25	--	--	--	--	--	--	25	25	25	25
Point Source Parameters																				
Stack Height (ft) ^(d)		7.0	9.2	1.0	9.2	6.4	12.7	0.8	--	--	0.0	0.0	0.0	0.0	0.0	13.0	--	--	--	--
Stack Diameter (ft) ^(k)		52.1	75.5	44.9	127.3	21.6	117.7	117.7	--	--	0.0001	0.0001	0.0001	0.0001	0.0001	0.3	--	--	--	--
Effluent Temperature (°F) ^(h)		1,050	900	1,000	842	1,100	1,000	1,000	--	--	0	0	0	0	0	0	--	--	--	--
Effluent Flowrate (cfm) ^{(g)(h)}		419	881	311	2,504	72	2,140	2,140	--	--	0	0	0	0	0	26.7	--	--	--	--
Effluent velocity (ft/min) ^(m)		0.2	0.2	0.2	0.2	0.2	0.2	0.2	--	--	0.0	0.0	0.0	0.0	0.0	544	--	--	--	--
Volume Source Parameters																				
Release Height (ft)		--	--	--	--	--	--	--	3.1	4.9	--	--	--	--	--	--	--	--	--	--
Initial Vertical Dimension (ft) ^(o)		--	--	--	--	--	--	--	2.9	4.6	--	--	--	--	--	--	--	--	--	--
Initial Lateral Dimension (ft) ^(p)		--	--	--	--	--	--	--	5.8	5.8	--	--	--	--	--	--	--	--	--	--
Line Source Parameters																				
Release Height (m)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.55	2.55	2.55	2.55
Initial Vertical Dimension (m) ^(o)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	2.4	2.4	2.4	2.4
Width (m) ^(q)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	7.6	7.6	7.6	7.6

Conversion Factors
3.28 ft/m

Notes

- ^a All sources originate in the center of the active work area for year 3 operations.
- ^b The haul road line source ends in the center of WMU 14 where materials will be transported to during year 3 operations. The construction truck line source end points are based on where there are bends/turns in the main road (Solano Way to Waterfront Road) to the project area.
- ^c Elevations calculated by AERMAP using digital elevation models obtained from the California Air Resources Board.
- ^d Stack heights are engineering assumptions based on images of typical construction equipment and analysis of similar systems.
- ^e LFG system stack diameter is an engineering assumptions based analysis of similar systems.
- ^f Effective parameters to represent horizontal stacks per guidance in the USEPA, *User's Guide for the AMS/EPA Regulatory Model (AERMOD)*, August 2019 (AERMOD User's Guide).
- ^g Diesel engine effluent parameters estimated based on properties of engines with comparable horsepower in the Donaldson Filtration Solutions Engine Exhaust Flow & Air Consumption Guide.
- ^h LFG system effluent flowrate based on preliminary design information.
- ⁱ Volume source vertical characterization for gasoline evaporation based on the estimated height of a Ford F-150. Volume source vertical characterization for construction fugitive dust, haul roads, and construction trucks based on the height of a typical haul truck per USEPA, *Haul Road Workgroup Recommendations*, November 2011 (USEPA Haul Road Recommendations).
- ^j Volume source lateral characterization for gasoline evaporation and construction fugitive dust are modeled as a central volume source although emissions can occur across the WMUs; the emissions are aggregated to a central location to represent the average emissions scenario. Volume source lateral characterization for haul roads and construction trucks are based on an estimated 2-lane haul road width of 25 feet.
- ^k Effective diameter for horizontal stacks back-calculated from effective velocity to maintain actual effluent flowrate per the AERMOD User's Guide. For the WMU modeling, the stack diameter is minimized to model the emissions as a pseudo point source.
- ^l LFG system effluent and WMUs assumed to release at ambient temperature. Temperature input of 0°F into HARP models ambient release.
- ^m Effluent velocity for horizontal stacks per AERMOD User's Guide and converted to feet per minute. Effluent velocity for LFG system calculated based on stack diameter and flowrate.
- ⁿ Release height for gasoline evaporation and construction fugitive dust calculated as half of the reference source height per the AERMOD User's Guide. Release height for haul roads and construction trucks calculated as [1.7 x reference source height / 2] per USEPA Haul Road Recommendations.
- ^o Initial vertical dimension for gasoline evaporation and construction fugitive dust calculated as the reference source height divided by 2.15 per the AERMOD User's Guide. Initial vertical dimension for haul roads and construction trucks calculated as [1.7 x reference source height / 2.15] per USEPA Haul Road Recommendations.
- ^p Initial lateral dimension for gasoline evaporation and construction fugitive dust calculated as the reference source width divided by 4.3 per the AERMOD User's Guide. Initial vertical dimension for haul roads and construction trucks calculated as [(Haul Road Width + 6 (meters) / 2.15] per USEPA Haul Road Recommendations.
- ^q Width for line sources are based on an estimated 2-lane road width of 25 feet.