Delta Research Station Project:
Estuarine Research Station and Fish Technology Center

Final Environmental Impact Report / Environmental Impact Statement

Volume II: Apendices

February 2017

Prepared for:

California Department of General Services on behalf of
California Department of Water Resources and U.S. Fish and Wildlife Service

CALIFORNIA DEPARTMENT OF GENERAL SERVICES

Prepared by:

Horizon Water and Environment

Delta Research Station – Estuarine Research Station and Fish Technology Center

Final Environmental Impact Report/Environmental Impact Statement

Volume 2 – Appendices

SCH# 2014122017

Prepared for:

State of California
Department of General Services
707 Third Street
West Sacramento, CA 95605

On behalf of Lead Agencies:

California Department of Water Resources and U.S. Fish and Wildlife Service

Prepared by:

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July 2016

Horizon Water and Environment. 2016. Delta Research Station – ERS and FTC Final Environmental Impact Report/Environmental Impact Statement. July. (HWE 13.014) Oakland, CA.

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Appendix A
NOTICE OF PREPARATION AND NOTICE OF INTENT

This appendix contains the Notice of Preparation (NOP) and Notice of Intent (NOI), as well as the mailing list for the NOP. As described in Chapter 1, *Introduction,* the NOP was circulated on December 8, 2014 and the NOI was published in the Federal Register on December 10, 2014. The NOP and NOI presented general background information on the Proposed Project, the scoping process, potential project alternatives, the anticipated environmental issues to be address in the Draft EIR/EIS, and the intended uses of the Draft EIR/EIS.

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Notice of Preparation

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Notice of Preparation

To: Responsible, Federal and Trustee Agencies
(Agency)

(Address)

From: California Department of Water Resources
1416 Ninth Street, Room 315-3/P.O. Box 942836
Sacramento, CA 94236-0001

Subject: **Notice of Preparation of a Draft Environmental Impact Report/Environmental Impact Statement for the Delta Research Station**

The California Department of Water Resources (DWR) and the U.S. Fish and Wildlife Service (USFWS) are preparing a joint environmental impact report (EIR)/environmental impact statement (EIS) for construction and operation of the Delta Research Station (DRS) in the San Francisco/Sacramento-San Joaquin Delta Estuary (Bay-Delta), California. DWR will be the lead State agency responsible for coordinating the environmental analysis for the Proposed Project under the California Environmental Quality Act (CEQA). The USFWS will be the lead Federal agency responsible for coordinating the environmental analysis under the National Environmental Policy Act (NEPA). DWR would like input from interested individuals, public agencies, and other parties regarding the scope and content of the EIR/EIS. Other public agencies may need to use the EIR/EIS prepared by DWR and the USFWS when considering any permit or other authorizations related to the Proposed Project.

The project description, location, and potential environmental effects are contained in the attached materials. A copy of the initial study ☐ ***is*** ☒ ***is not*** attached.

Because of the time limits mandated by state law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Mr. John Engstrom at the address above. Please include your name or the name of a contact person in your agency.

Project Title: Delta Research Station EIR/EIS

Project Applicant, if any: n/a

Date: 11/21/2014

Signature:

Name: John Engstrom

Title: Supervising Architect

Telephone: 916-651-8745

Email: John.engstrom@water.ca.gov

Reference: Cal. Code Regs., tit. 14, (CEQA Guidelines) Sections 15082, subd. (a), 15103, 15375.

1. Introduction

Pursuant to CEQA and NEPA, DWR and the USFWS are initiating preparation of a joint EIR/EIS for the DRS, a proposed science and research center in the Bay-Delta. The planned DRS would consist of two facilities, a proposed Estuarine Research Station (ERS) and Fish Technology Center (FTC). DWR will serve as the CEQA State lead agency, and USFWS will serve as the Federal lead agency. DWR is circulating this Notice of Preparation (NOP) to initiate the scoping process under CEQA. USFWS is publishing a Notice of Intent in the Federal Register concurrent with the circulation of this NOP to initiate the scoping process at the federal level.

The purpose of the scoping process is to solicit early input from the public and responsible, cooperating and trustee agencies regarding the development of reasonable alternatives and potential environmental impacts to be addressed in the EIR/EIS for the DRS. The planning effort for the DRS is in the preliminary stages of development, and further information regarding the various features of the DRS may be provided to the public as they are defined.

2. Overview and Purpose of the Delta Research Station

DWR and USFWS are currently in the planning stages for development of the DRS, a science and research center in the Bay-Delta, which would consolidate a number of existing and new activities into the proposed ERS and FTC and bring together State and Federal agency staff working on similar Bay-Delta issues. The purpose of the DRS is to enhance interagency coordination and collaboration by developing a shared research facility. The DRS would advance the interests of researchers, local communities, and others that are dependent on the Bay-Delta. The DRS is needed because current State and Federal agency staff working on similar Bay-Delta issues are spread out in different locations, located in areas remote from the Bay-Delta, or have limited resources, inhibiting efficient research and monitoring efforts and collaboration.

The specific objectives of each component of the DRS are as follows:

- ERS –
  - Establish a research station in a central location within the Bay-Delta to facilitate ease of conducting monitoring and research; and
  - Co-locate the research station with a facility capable of studying fish in captivity (i.e., the FTC); and.
  - Provide facilities to conduct monitoring and research on the Bay-Delta's aquatic resources.
- FTC –
  - Develop captive propagation technologies for the Bay-Delta's rare fish species;
  - Test and refine the captive propagation techniques;

- Locate the facility where suitable water quality and quantity are available, and ability to discharge waste water given its various functions and operations is available; and

- Co-locate the FTC with a facility conducting conservation research on Bay-Delta rare fish species (i.e., the ERS).

DWR and USFWS are jointly proposing development of the ERS and FTC, as these facilities would be co-located with one another and potentially built at the same time (although they may be built at different times). Collectively, these facilities are referred as the Proposed Project throughout this NOP.

3. Project Description

3.1 Estuarine Research Station

The ERS would be a center for research and study of the Bay-Delta ecosystem. The ERS would provide improved and additional facilities for science and research activities and would consolidate over 160 State and Federal employees from the Interagency Ecological Program (IEP). The IEP is a multi-agency cooperative effort to provide ecological information to support management of the Bay-Delta. The IEP monitors, researches, models, and synthesizes critical information in the Bay-Delta to support water management and planning and protection of fish and aquatic ecosystems. ERS facilities would include office and workspace, wet and dry laboratory facilities, warehouse and boat storage space, a marina, and a vehicle and boat repair shop. Laboratory facilities would include optical equipment (e.g., microscopes), fume hoods, computer stations, and water tanks of various sizes for processing of field samples and experimental studies of fish and ecology. The ERS would also include a dry electrical lab to house electronic sensing, monitoring, and telecommunications equipment used to monitor tagged fish and the estuarine environment. The ERS would be managed by DWR.

3.2 Fish Technology Center

The FTC would be a center for research, conservation, and study of rare Bay-Delta fishes. The FTC is also intended to house and maintain a refugial population of rare fish species (i.e., captively raised fish). The FTC would include research and study facilities, an office and administration building, a shop and vehicle storage building, a water treatment facility, and an effluent treatment facility. The FTC would include separate aquaculture and research components for individual study species and a laboratory space to support water quality, genetic, and fish health analysis. The FTC would be managed by USFWS and would be sited immediately adjacent to the ERS.

4. Project Area and Alternatives

The EIR/EIS will include an analysis of the effects of three potential alternatives, plus the no project alternative. The first two potential alternatives involve locating the ERS and FTC at the Rio Vista Army Base (sometimes referred to as the Rio Vista Army Reserve Center) in the City of Rio Vista (see **Figures 1** and **2**), with each alternative representing a different site configuration. The third alternative is to locate the facilities in the City of Stockton (see **Figures 1** and **3**). All alternatives would be evaluated at an equal level of detail in the EIR/EIS.

5. Potential Environmental Effects

The EIS/EIS will analyze the reasonably foreseeable direct, indirect and cumulative effects (e.g. climate change, including sea level rise) of the Project and a reasonable range of alternatives on a wide range of resources, including but not limited to:

- Aesthetics
- Air Quality and Greenhouse Gas Emissions
- Biological Resources – Terrestrial
- Biological Resources – Fisheries
- Cultural Resources
- Geology and Soils
- Hazards and Hazardous Materials
- Hydrology and Water Quality
- Land Use and Planning
- Noise
- Population and Housing
- Public Services, Utilities, and Energy
- Recreation
- Traffic and Transportation

Comments provided in response to the NOP and NOI, provided in the planned scoping meetings, and ensuing analyses may identify additional environmental resources to be evaluated.

6. Scoping Meetings

Two public scoping meetings associated with this NOP will take place. One meeting will be held in Rio Vista and the other meeting will be held Stockton. The dates, times, and addresses for these scoping meetings are as follows:

Monday, December 15th, 5:30-7:30pm
D.H. White Elementary School, 500 Elm Way, Rio Vista, CA 94571

Tuesday, December 16th, 5:30-7:30pm
Arnold Rue Community Center, 5758 Lorraine Ave, Stockton, CA 95210

If special assistance is required to participate in the public scoping meetings, please contact Michael Stevenson (Michael@horizonh2o.com, 510-986-1852) as far in advance as possible to enable the Department of Water Resources to secure the needed services. A telephone device for the hearing impaired (TDD) can be made available upon request. If a request cannot be honored, the requestor will be notified.

Additional information regarding these meetings is available on the website for the Proposed Project: www.deltaresearchstation.com.

The scoping meetings will begin with an open house during which attendees will be able to interact with representatives of DWR, USFWS, and other staff involved in preparation of the EIR/EIS. This will be followed by a presentation describing the Proposed Project and the CEQA/NEPA process. After the presentation, DWR and USFWS will receive public comments. Anyone interested in more information concerning the EIR/EIS process, or anyone who has information concerning the Proposed Project or suggestions as to significant issues, should contact Mr. John Engstrom as provided below.

7. Written Comments

This NOP is being furnished to obtain suggestions and information from other agencies and the public on the scope and issues and alternatives that should be addressed in the EIR component of the joint EIR/EIS. The primary purpose of the scoping process is to identify important issues raised by the public and affected agencies related to the Proposed Project. Written comments from interested parties are invited to ensure that the full range of issues related to development of the Proposed Project are identified. All comments received, including names and addresses, will become part of the administrative record and may be made available to the public. Written comments on this part of the scoping process will be accepted until **January 6, 2015.**

Within 30 days after receiving the NOP, each responsible and/or trustee agency may, at its discretion, provide DWR with specific details about the suggested scope of the EIR/EIS, significant environmental issues, reasonable alternatives, and mitigation measures related to that agency's jurisdiction and/or area of expertise. In accordance with CEQA Guidelines Section 15082(b)(1)(B), responsible and trustee agencies should indicate their respective level of responsibility for the Proposed Project in their response.

DWR's practice is to make comments, including names, addresses, phone numbers, and email addresses of respondents, available for public review. Individual respondents may request that their name and/or address, etc., be withheld, but if you wish this information to be withheld, you must state this prominently at the beginning of your comments.

Written comments on the scope of the EIR/EIS should be sent to John Engstrom, California Department of Water Resources, 1416 Ninth Street, Room 315-3/P.O. Box 942836, Sacramento, CA 94236-0001 or via email at scoping@deltaresearchstation.com. Email is preferred.

John Engstrom

Date 11/24/14

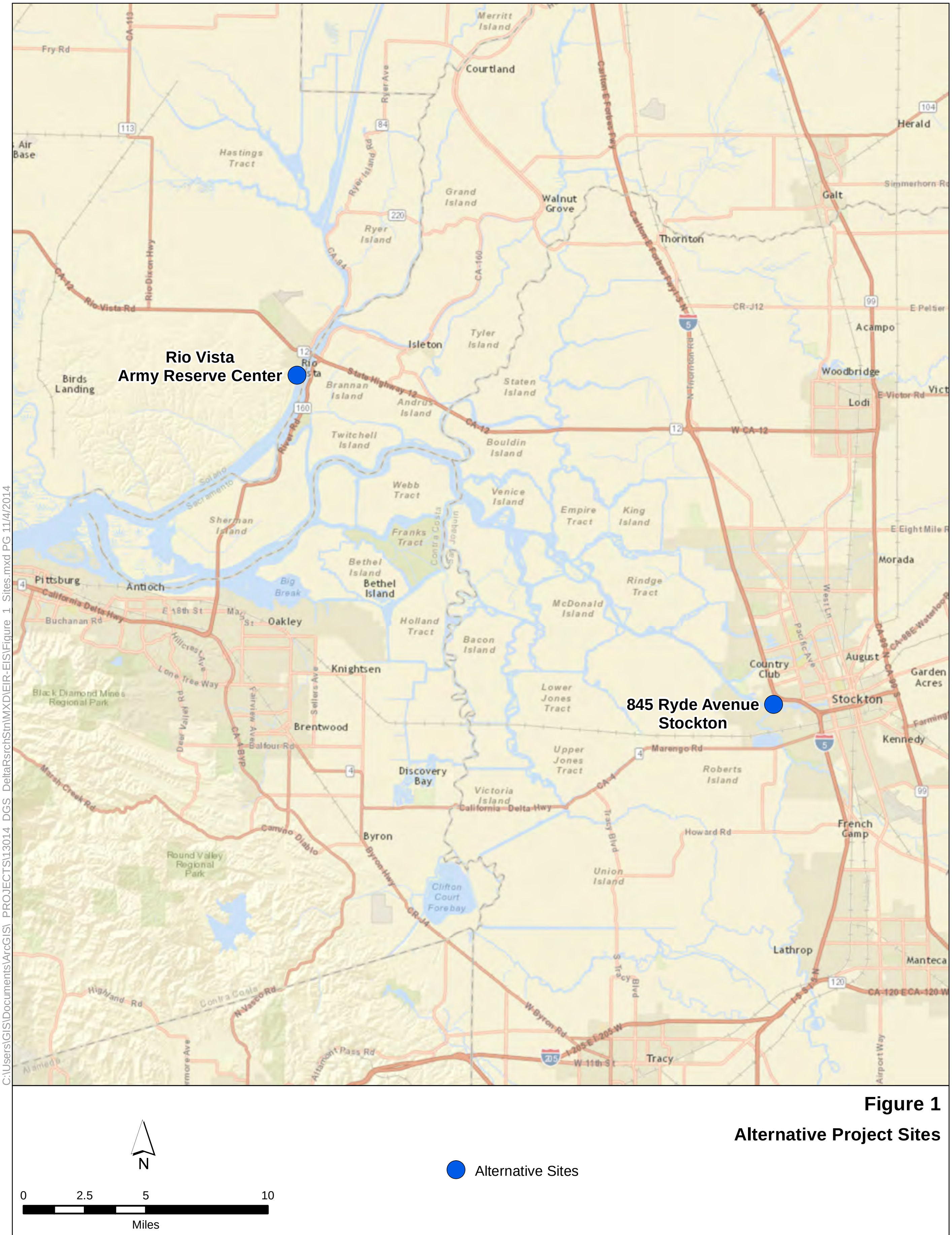

Figure 1

Alternative Project Sites

C:\Users\GIS\Documents\ArcGIS\ PROJECTS\13014 DGS DeltaRsrchStn\MXD\EIR-EIS\Figure 1 Sites.mxd PG 11/4/2014

N

0 0.125 0.25
Miles

Parcel Boundary

Figure 2

Rio Vista Army Reserve Center

N

0 0.125 0.25
Miles

Horizon WATER and ENVIRONMENT

Parcel Boundary

Figure 3

845 Ryde Avenue, Stockton

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Notice of Intent

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DEPARTMENT OF INTERIOR

Fish and Wildlife Service

[FWS–R8–FAC–2014–N224]

Notice of Intent To Conduct Public Scoping and Prepare an Environmental Impact Statement/Environmental Impact Report Regarding the Delta Research Station—Estuarine Research Station and Fish Technology Center Project

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of intent.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and the California Environmental Quality Act (CEQA) and State CEQA Guidelines, the U.S. Fish and Wildlife Service (USFWS) and the California Department of Water Resources (DWR) intend to prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to evaluate impacts regarding construction and operation of the Delta Research Station (DRS) in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta), California. The planned DRS would consist of two facilities, a proposed Estuarine Research Station (ERS) and Fish Technology Center (FTC). The USFWS will be the lead Federal agency responsible for coordinating the environmental analysis for the proposed action under NEPA. DWR will be the lead State agency responsible for coordinating the environmental analysis under CEQA. With this notice, USFWS and DWR are announcing the beginning of the scoping process to solicit public comments and identify issues.

DATES: This notice initiates the public scoping processes for the EIS/EIR. Comments on issues must be submitted in writing and postmarked January 9, 2015. Two scoping meetings will be held during the scoping period, one in Rio Vista and one in Stockton. The dates and locations of these scoping meetings will be announced at least 15 days in advance through the project Web site at *www.deltaresearchstation.com.*

ADDRESSES: Comments and requests for information related to the preparation of the EIS/EIR should be sent to USFWS, Attn: Barbara Beggs, 650 Capitol Mall Suite 8–300, Sacramento, CA 95691; and/or emailed to *barbara_beggs@fws.gov.*

FOR FURTHER INFORMATION CONTACT: Barbara Beggs, USFWS, at 916–930–5637.

SUPPLEMENTARY INFORMATION:

Overview of the DRS

USFWS and DWR are currently planning development of the DRS, a science and research center in the Bay-Delta, which would consolidate a number of existing and new activities into the proposed ERS and FTC and bring together Federal and State agency staff working on similar Bay-Delta issues.

Project Purpose

The purpose of the DRS is to enhance interagency coordination and collaboration by developing a shared research facility. The DRS would advance the interests of researchers, local communities, and others that are dependent on the Bay-Delta. The DRS is needed because current Federal and State agency staff working on similar Bay-Delta issues are spread out in different locations, located in areas remote from the Bay-Delta, or have limited resources, inhibiting efficient research and monitoring efforts and collaboration.

The specific objectives of each component of the DRS are as follows:

- ERS—
  - Establish a research station in a central location within the Bay-Delta to facilitate ease of conducting monitoring and research; and
  - Co-locate the research station with a facility capable of studying fish in captivity (*i.e.,* the FTC); and
  - Provide facilities to conduct monitoring and research on the Bay-Delta's aquatic resources.
- FTC—
  - Develop captive propagation technologies for the Bay-Delta's rare fish species;
  - Test and refine the captive propagation techniques;
  - Locate the facility where suitable water quality and quantity are available, and ability to discharge waste water given its various functions and operations is available; and
  - Co-locate the FTC with a facility conducting conservation research on Bay-Delta rare fish species (*i.e.,* the ERS).

Proposed Action and Alternatives

At this time, USFWS and DWR are proposing development of the ERS and FTC, as these facilities would be co-located with one another and potentially built at the same time. Collectively, these facilities are referred as the proposed action. Currently, three potential alternatives plus the no action/no project alternative are being considered for the proposed ERS and FTC. The first two potential alternatives involve locating the facilities at the Rio Vista Army Base in the City of Rio Vista, with each alternative representing a different site configuration within the base. The third alternative is to locate the facilities in the City of Stockton, California. All alternatives would be evaluated at an equal level of detail in the EIS/EIR. Below is a description of the two proposed facilities.

Proposed Facilities

The ERS would be a center for research and study of the Bay-Delta ecosystem. The ERS would provide improved and additional facilities for science and research activities and would consolidate over 160 State and Federal employees from the Interagency Ecological Program (IEP). The IEP is a multi-agency cooperative effort to provide ecological information to support management of the Bay-Delta. The IEP monitors, researches, models, and synthesizes critical information in the Bay-Delta to support water management and planning and protection of fish and aquatic ecosystems. ERS facilities would include office and workspace, wet and dry laboratory facilities, warehouse and boat storage space, a marina, and a vehicle and boat repair shop. Laboratory facilities would include optical equipment (*e.g.,* microscopes), fume hoods, computer stations, and water tanks of various sizes for processing of field samples and experimental studies of fish and ecology. The ERS would also include a dry electrical lab to house electronic sensing, monitoring, and telecommunications equipment used to monitor tagged fish and the estuarine environment. The ERS would be managed by DWR.

The FTC would be a center for propagation, research, conservation, and study of rare Bay-Delta fishes. The FTC is also intended to house and maintain a refugial population of rare fish species (*i.e.,* captively raised fish). The FTC would include research and study facilities, an office and administration building, a shop and vehicle storage building, a water treatment facility for surface water, and an effluent treatment facility. The FTC would include separate aquaculture and research components for individual study species and a laboratory space to support water quality, genetic, and fish health analysis. The FTC would be managed by USFWS and would be sited immediately adjacent to the ERS.

Statutory Authority

NEPA (42 U.S.C. 4321 *et seq.*) requires that Federal agencies conduct an environmental analysis of their proposed actions to determine if the actions may significantly affect the human environment. Under NEPA and its implementing regulations (40 CFR 1500 *et seq.*), a reasonable range of alternatives to the proposed action is developed and considered in the EIS/EIR. In addition, the EIS/EIR will identify potentially significant direct, indirect, and cumulative effects, and possible mitigation for those significant effects on environmental issues that could occur with implementation of the proposed action.

Identification of Environmental Issues

The EIS/EIR will evaluate potential environmental impacts from the ERS and FTC. This notice is intended to inform agencies and the public of the potential environmental impacts of the facilities, and to solicit comments and suggestions for consideration in the preparation of the EIS/EIR. To help the public frame its comments, the following is a list of several potential environmental issues that USFWS and DWR have identified for analysis:

1. Aesthetics
2. Air Quality and Greenhouse Gas Emissions
3. Biological Resources—Terrestrial
4. Biological Resources—Fisheries
5. Cultural Resources
6. Geology and Soils
7. Hazards and Hazardous Materials
8. Hydrology and Water Quality
9. Land Use and Planning
10. Noise
11. Population and Housing
12. Public Services, Utilities, and Energy
13. Socioeconomics and Environmental Justice
14. Traffic and Transportation

Request for Comments

Environmental review of the EIS/EIR will be conducted in accordance with the requirements of NEPA (42 U.S.C. 4321 *et seq.*), its implementing regulations (40 CFR parts 1500–1508), other applicable regulations, and the USFWS' procedures for compliance with those regulations; and according to the requirements of CEQA (PRC Section 21000 *et seq.*) and State CEQA Guidelines (California Code of Regulations Title 14 Section 15000 *et seq.*). This notice is being furnished in accordance with 40 CFR 1501.7 and 1508.22 to obtain suggestions and information from interested agencies, organizations, Native American Tribes, and members of the public on the scope of issues and alternatives that will be addressed in the EIS/EIR. The primary purpose of the scoping process is to identify important issues raised by the public related to development of the proposed action. Written comments from interested parties are invited to ensure that the full range of issues related to the development of the proposed action is identified. Comments during this stage of the scoping process will only be accepted in written form. All comments received, including names and addresses, will become part of the official administrative record and may be made available to the public.

Public Availability of Comments

Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment—including your personal identifying information—may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so.

Next Steps

After this scoping process, USFWS and DWR will review public comments and then prepare and make publicly available a draft EIS/EIR for comment.

Alexandra Pitts,

Deputy Regional Director, Pacific Southwest Region, Fish and Wildlife Service.

[FR Doc. 2014–28891 Filed 12–9–14; 8:45 am]

BILLING CODE P

DEPARTMENT OF THE INTERIOR

Office of Surface Mining Reclamation and Enforcement

[S1D1S SS08011000 SX066A000 67F 134S180110; S2D2S SS08011000 SX066A00 33F 13xs501520]

Notice of Proposed Information Collection; Request Comments for 1029–0083

AGENCY: Office of Surface Mining Reclamation and Enforcement, Department of the Interior.

ACTION: Notice and request for comments.

SUMMARY: In compliance with the Paperwork Reduction Act of 1995, the Office of Surface Mining Reclamation and Enforcement (OSMRE) is announcing that the information collection request related to the certification of blasters in Federal program states and on Indian lands, and Form OSMRE–74, has been forwarded to the Office of Management and Budget (OMB) for review and reauthorization. The information collection package was previously approved and assigned clearance number 1029–0083. This notice describes the nature of the information collection activity and the expected burdens and costs.

DATES: OMB has up to 60 days to approve or disapprove the information collection but may respond after 30 days. Therefore, public comments should be submitted to OMB by January 9, 2015, in order to be assured of consideration.

ADDRESSES: Submit comments to the Office of Information and Regulatory Affairs, Office of Management and Budget, Attention: Department of the Interior Desk Officer, by telefax at (202) 395–5806 or via email to *OIRA_Submission@omb.eop.gov*. Also, please send a copy of your comments to John Trelease, Office of Surface Mining Reclamation and Enforcement, 1951 Constitution Ave. NW., Room 203–SIB, Washington, DC 20240, or electronically to *jtrelease@osmre.gov*.

FOR FURTHER INFORMATION CONTACT: To receive a copy of the information collection request contact John Trelease at (202) 208–2783, or electronically at *jtrelease@osmre.gov.* You may also review this collection request by going to *http://www.reginfo.gov* (Information Collection Review, Currently Under Review, Agency is Department of the Interior, DOI–OSMRE).

SUPPLEMENTARY INFORMATION: The Office of Management and Budget (OMB) regulations at 5 CFR part 1320, which implement provisions of the Paperwork Reduction Act of 1995 (Pub. L. 104–13), require that interested members of the public and affected agencies have an opportunity to comment on information collection and recordkeeping activities [see 5 CFR 1320.8(d)]. OSMRE has submitted a request to OMB to renew its approval for the collection of information for 30 CFR part 955 and the Form OSMRE–74, Certification of Blasters in Federal program states and on Indian lands. OSMRE is requesting a 3-year term of approval for these information collection activities.

An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. The OMB control number for this collection of information is listed in 30 CFR 955.10 and on the Form OSMRE–74, which is 1029–0083.

As required under 5 CFR 1320.8(d), a **Federal Register** notice soliciting comments on the collection of information was published on September 4, 2014 (79 FR 52749). No comments were received from that

NOP Mailing List

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NAME	ADDRESS	CITY	STATE	ZIP
Resident	8001 Montezuma Hills Road	Rio Vista	CA	94571
Resident	2285 Beach Drive	Rio Vista	CA	94571
Resident	2170 Beach Dr	Rio Vista	CA	94571
Resident	1851 Beach Dr	Rio Vista	CA	94571
Resident	1570 Beach Dr	Rio Vista	CA	94571
Resident	1173 Beach Dr	Rio Vista	CA	94571
Resident	1277 Beach Dr	Rio Vista	CA	94571
Resident	1373 Beach Dr	Rio Vista	CA	94571
Resident	725 Beach Dr	Rio Vista	CA	94571
Resident	714 Beach Dr	Rio Vista	CA	94571
Resident	733 Beach Dr	Rio Vista	CA	94571
City Gardens Mobile Home Park	2635 W Fremont Street	Stockton	CA	95203
Gametime Gear	2894 Monte Diablo Ave	Stockton	CA	95203
All Star Sports	2894 Monte Diablo Ave	Stockton	CA	95203
Klamath Meeting & Reception	2894 Monte Diablo Ave	Stockton	CA	95203
Rare Parts Inc	621 Wilshire Avenue	Stockton	CA	95203
Resident	763 Wilshire Ave	Stockton	CA	95203
Resident	955 Ryde Ave	Stockton	CA	95203
Resident	1039 Ryde Ave	Stockton	CA	95203
Resident	2714 Monte Diablo Ave	Stockton	CA	95203
Resident	2722 Monte Diablo Ave	Stockton	CA	95203
Resident	2728 Monte Diablo Ave	Stockton	CA	95203
Resident	2740 Monte Diablo Ave	Stockton	CA	95203
Resident	2744 Monte Diablo Ave	Stockton	CA	95203
Resident	2748 Monte Diablo Ave	Stockton	CA	95203
Resident	2750 Monte Diablo Ave	Stockton	CA	95203
Resident	2808 Monte Diablo Ave	Stockton	CA	95203
Resident	2816 Monte Diablo Ave	Stockton	CA	95203
Resident	2822 Monte Diablo Ave	Stockton	CA	95203
Resident	2832 Monte Diablo Ave	Stockton	CA	95203
Resident	2824 Monte Diablo Ave	Stockton	CA	95203
Resident	2766 Monte Diablo Ave	Stockton	CA	95203
Resident	2732 Monte Diablo Ave	Stockton	CA	95203
Resident	2718 Monte Diablo Ave	Stockton	CA	95203
Resident	27202 Monte Diablo Ave	Stockton	CA	95203
Resident	2834 Monte Diablo Ave	Stockton	CA	95203
Resident	2844 Monte Diablo Ave	Stockton	CA	95203
Resident	2894 Monte Diablo Ave	Stockton	CA	95203
Resident	844 Ryde Ave	Stockton	CA	95203
Resident	830 Ryde Ave	Stockton	CA	95203
Resident	2416 W. Fremont St	Stockton	CA	95203
Resident	2416 W. Fremont St	Stockton	CA	95203
Resident	1002 Ryde Ave	Stockton	CA	95203
Resident	1002 Ryde Ave	Stockton	CA	95203
Resident	1002 Ryde Ave	Stockton	CA	95203
Resident	2650 Monte Diablo Ave	Stockton	CA	95203
Resident	2505 W. Fremont St	Stockton	CA	95203
Resident	2511 W. Fremont St	Stockton	CA	95203
Resident	2519 W. Fremont St	Stockton	CA	95203
Resident	815 King Ave.	Stockton	CA	95203
Resident	2411 W. Fremont St	Stockton	CA	95203
Resident	2419 W. Fremont St	Stockton	CA	95203
Resident	2425 W. Fremont St	Stockton	CA	95203

Resident	2443 W. Fremont St	Stockton	CA	95203
Resident	2223 W. Fremont St	Stockton	CA	95203
Resident	2327 W. Fremont St	Stockton	CA	95203
Resident	2335 W. Fremont St	Stockton	CA	95203
Resident	2319 W. Fremont St	Stockton	CA	95203
Resident	2303 W. Fremont St	Stockton	CA	95203
Resident	747 Wilshire Ave	Stockton	CA	95203
Resident	734 Wilshire Ave	Stockton	CA	95203
Resident	100 Marina Dr.	Rio Vista	CA	94571
Resident	8430 Montezuma Hills Rd	Rio Vista	CA	94571

FIRST NAME	LAST NAME	ORGANIZATION	ADDRESS	ADDRESS 2	CITY	STATE	ZIP
JEFF	MELBY	CA COASTAL CONSERVANCY	1330 BROADWAY	11TH FLOOR	OAKLAND	CA	94612
SCOTT	CANTRELL	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	1416 NINTH ST	ROOM 1342C	SACRAMENTO	CA	95814
MARK	CLIFFORD	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	#3 NORTH OLD STAGE ROAD		MT. SHASTA	CA	96067
LARRY	ENG	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	1701 NIMBUS RD	SUITE A	RANCHO CORDOVA	CA	95670
GREG	ERICKSON	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	850 GUILD AVE	SUITE 105	LODI	CA	95240
MARK	STEVENSON	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	MARINE REGION, 20 LOWER RA(	SUITE 100	MONTEREY	CA	93940
SCOTT	WILSON	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	7329 SILVERADO TRAIL		NAPA	CA	94558
MARINA	BRAND	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE - ECOSYSTEM RESTORATION UNIT (CVBD BRANCH)	2109 ARCH ROAD		STOCKTON	CA	95206
JOHN P	DONNELLY	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE - WILDLIFE CONSERVATION BOARD	1807 13TH ST	SUITE 103	SACRAMENTO	CA	95811
JEFF	PULVERMAN	CALIFORNIA DEPARTMENT OF TRANSPORTATION	P O BOX 911		MARYSVILLE	CA	95901
TERRI	PENCOVIC	CALIFORNIA DEPARTMENT OF TRANSPORTATION	1120 N ST		SACRAMENTO	CA	95814
DENNIS	AGAR	CALIFORNIA DEPARTMENT OF TRANSPORTATION - DISTRICT 10	1976 EAST CHARTER WAY / EAST DR. MARTIN LUTH		STOCKTON	CA	95205
BIJAN	SARTIPI	CALIFORNIA DEPARTMENT OF TRANSPORTATION - DISTRICT 4	P.O. BOX 23660		OAKLAND	CA	94612
PAUL D.	THAYER	CALIFORNIA STATE LANDS COMMISSION	100 HOWE AVE	SUITE 100 SOUTH	SACRAMENTO	CA	95825
ERIC	BUTLER	CENTRAL VALLEY FLOOD PROTECTION BOARD	3310 EL CAMINO AVENUE	ROOM 151	SACRAMENTO	CA	95821
ELIZABETH	LEE	CENTRAL VALLEY REGIONAL WATER QUALITY CONTROL BOARD	11020 SUN CENTER DR	SUITE 200	RANCHO CORDOVA	CA	95670-6114
MELILLI	DAVID	CITY OF RIO VISTA	1 MAIN ST		RIO VISTA	CA	94571
MARK J.	MADISON	CITY OF STOCKTON	2500 NAVY DR		STOCKTON	CA	95206
CAMPBELL	INGRAM	DELTA CONSERVANCY	1450 HALYARD DRIVE		WEST SACRAMENTO	CA	95691
ERIK	VINK	DELTA PROTECTION COMMISSION	2101 STONE BLVD	SUITE 210	WEST SACRAMENTO	CA	95691
PETER	GOODWIN	DELTA SCIENCE PROGRAM	980 NINTH STREET	SUITE 1500	SACRAMENTO	CA	95814
STEVE	WATANABE	DEPT OF BOATING & WATERWAYS	ONE CAPITAL MALL	SUITE 500	SACRAMENTO	CA	95814
JOHN	GARAMENDI	HOUSE OF REPRESENTATIVES	2438 RAYBURN HOUSE OFFICE I	DISTRICT 3	WASHINGTON	DC	20515
JERRY	MCNERNEY	HOUSE OF REPRESENTATIVES	2411 RAYBURN HOUSE OFFICE I	DISTRICT 11	WASHINGTON	DC	20515
JEFF	MCCLAIN	NATIONAL MARINE FISHERIES SERVICE	650 CAPITAL MALL	SUITE 5-100	SACRAMENTO	CA	95814
		NATIVE AMERICAN HERITAGE COMMISSION	1550 HARBOR BLVD	SUITE 100	WEST SACRAMENTO	CA	95691
		RECLAMATION DISTRICT 341	18419 STATE HIGHWAY 160		RIO VISTA	CA	94571
		RECLAMATION DISTRICT 828	221 TUXEDO COURT, #F		STOCKTON	CA	95204
KERRY	SULLIVAN	SAN JOAQUIN COUNTY	1810 EAST HAZELTON AVE		STOCKTON	CA	95205
KERRY	SULLIVAN	SAN JOAQUIN COUNTY COMMUNITY DEVELOPMENT DEPARTMENT	1810 E. HAZELTON AVE.		STOCKTON	CA	95205
		SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT - CENTRAL REGION	1990 E GETTYSBURG AVE		FRESNO	CA	93726
		SAN JOAQUIN VALLEY AIR POLLUTION CONTROL DISTRICT - NORTHERN REGION	4800 ENTERPRISE WAY		MODESTO	CA	95356
		SOLANO CO. CLERK OF THE BOARD OF SUPERVISORS	675 TEXAS ST.		FAIRFIELD	CA	94533
		SOLANO CO. RESOURCE MANAGEMENT	675 TEXAS ST.	#5500	FAIRFIELD	CA	94533
MIKE	YANKOVICH	SOLANO COUNTY PLANNING SERVICES DIVISION	675 TEXAS ST	SUITE 5500	FAIRFIELD	CA	94533-6341
		SOLANO TRANSPORTATION AUTHORITY	ONE HARBOR CENTER #130		SUISUN CITY	CA	94585
		STATE CLEARINGHOUSE	1400 TENTH STREET		SACRAMENTO	CA	95814
CAROL	ROLAND-NAWI	STATE HISTORIC PRESERVATION OFFICER	1725 23RD STREET	SUITE 100	SACRAMENTO	CA	95816
PEDRO	VILLALOBOS	STATE WATER PROJ ANALYSIS OFFICE	1416 NINTH ST	ROOM 1620	SACRAMENTO	CA	95814
JOHN P	GERLACH	STATE WATER RESOURCES CONTROL BOARD	1001 I ST		SACRAMENTO	CA	95814
		STOCKTON PORT DISTRICT	P O BOX 2089		STOCKTON	CA	95201
RODNEY	MCINNIS	U S DEPT OF COMMERCE NOAA	501 W OCEAN BLVD	SUITE 4200	LONG BEACH	CA	90802
MARK	FUGLAR	U.S. ARMY CORPS OF ENGINEERS	1325 J ST	ROOM 1350	SACRAMENTO	CA	95814
		U.S. COAST GUARD - 11TH COAST GUARD DISTRICT	900 BEACH DRIVE		RIO VISTA	CA	94571
SUSAN	FRY	US BUREAU OF RECLAMATION	801 I STREET	SUITE 140	SACRAMENTO	CA	95814
MICHAEL	ORCUTT	US DEPARTMENT OF INTERIOR: BUREAU OF INDIAN AFFAIRS	2800 COTTAGE WAY		SACRAMENTO	CA	95825
ERIN	FORESMAN	US ENVIRONMENTAL PROTECTION AGENCY REGION IX	75 HAWTHORNE ST		SAN FRANCISCO	CA	94105
PAUL	WORK	USGS	6000 J. ST, PLACER HALL		SACRAMENTO	CA	95819

MAT	EHRARHDT	YOLO-SOLANO AIR QUALITY MANAGEMENT DISTRICT	1947 GALILEO CT.	SUITE 103	DAVIS	CA	95618
MARY	SMALL	CA COASTAL CONSERVANCY	1330 BROADWAY	11TH FLOOR	OAKLAND	CA	94612
BRIAN	FINLAYSON	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	1701 NIMBUS RD	SUITE F	RANCHO CORDOVA	CA	95670
CARL	WILCOX	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE	1416 NINTH ST	ROOM 1342C	SACRAMENTO	CA	95814
SANDY	MOREY	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE - CENTRAL REGION	1701 NIMBUS RD		RANCO CORDOVA	CA	95670
TODD	GARDNER	CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE - DELTA LEVEE HABITAT IMPROVEMENT PROGRAM	1701 NIMBUS RD	SUITE A	RANCHO CORDOVA	CA	95670
		CHARTER CABLE	203 SE PARK PLAZA DR. #290		VANCOUVER	WA	98684
		COMCAST CABLE	111 ANDERSEN DRIVE		SAN RAFAEL	CA	94901
		DELTA MARINA YACHT HARBOR	100 MARINA ST		RIO VISTA	CA	94571
SAM	HARADER	DELTA SCIENCE PROGRAM	980 NINTH STREET	SUITE 1500	SACRAMENTO	CA	95814
LAUREN	HASTINGS	DELTA SCIENCE PROGRAM	980 NINTH STREET	SUITE 1500	SACRAMENTO	CA	95814
CINDY	MESSER	DELTA STEWARDSHIP COUNCIL	980 NINTH STREET	SUITE 1500	SACRAMENTO	CA	95814
		FRONTIER COMMUNICATIONS	9262 E. STOCKTON BLVD.		ELK GROVE	CA	95624
BRUCE	OPPENHEIM	NATIONAL MARINE FISHERIES SERVICE	650 CAPITOL MALL	SUITE 8-300	SACRAMENTO	CA	95814
MARIA	REA	NATIONAL MARINE FISHERIES SERVICE	650 CAPITOL MALL	SUITE 8-300	SACRAMENTO	CA	95814
JEFF	STUART	NATIONAL MARINE FISHERIES SERVICE	650 CAPITOL MALL	SUITE 8-300	SACRAMENTO	CA	95814
		PACIFIC GAS & ELECTRIC CO.	770 MASON ST. #160		VACAVILLE	CA	95668
		RIO VISTA LIBRARY	44 SOUTH SECOND ST.		RIO VISTA	CA	94571
		RIO VISTA SANITATION	100 MAIN STREET		RIO VISTA	CA	94571
GITA	KAPAHI	STATE WATER RESOURCES CONTROL BOARD	P O BOX 2000		SACRAMENTO	CA	95814
BARBARA	LEIDIGH	STATE WATER RESOURCES CONTROL BOARD	1001 I ST		SACRAMENTO	CA	95814
GREG	WILSON	STATE WATER RESOURCES CONTROL BOARD	P O BOX 100		SACRAMENTO	CA	95812-0100
EILEEN	IMAMURA	U.S. ARMY CORPS OF ENGINEERS	1325 J ST	ROOM 1351	SACRAMENTO	CA	95814
LAURA	FUJII	US ENVIRONMENTAL PROTECTION AGENCY REGION IX	75 HAWTHORNE ST		SAN FRANCISCO	CA	94105
ROGER	FUJII	USGS - WRD	6000 J. ST, PLACER HALL		SACRAMENTO	CA	95819
LARRY P. AND BETTY	DAVIS		738 THEREZA WY		RIO VISTA	CA	94571
MAYHOOD E.	DEXTER, III		PO BOX 155		RIO VISTA	CA	94571
ROBERT, STEVEN & CRISTA	HAYNES		740 BEACH DRIVE		RIO VISTA	CA	94571
KENT AND CAROLYN	HESPELER		770 BEACH DR		RIO VISTA	CA	94571
JAMES AND CAROL	NICOLETTE		PO BOX 1065		RIO VISTA	CA	94571

Appendix B
SCOPING MEETING MATERIALS

This appendix contains the public scoping meeting materials for the DRS or Proposed Project. As described in Chapter 1, *Introduction,* scoping meetings were held for the Proposed Project to allow the public and regulatory agencies with additional opportunities to ask questions and submit comments on the scope of the Draft EIR/EIS. Scoping meetings were held in Rio Vista, CA on December 15, 2015, and in Stockton, CA on December 16, 2015. Meeting materials include sign-in sheets, speaker forms, written comment form, PowerPoint presentation slides, and posters.

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Delta Research Station

Public Scoping Meeting Sign In Sheet

December 15, 2014 – Rio Vista, CA

Name	Address	Email Address	Organization (optional)	Phone Number (optional)
Lynne Hansen	385 Del Monte Dr	LYNNEHiv@Aol.com	RioVision	
Marci Coglianese	105 Lassen Ct.	marci.coglianese@comcast.net	City of Rio Vista Army Base com	707-374-2857
Sue Corb[illegible]	202 Riviera	sueriov@gmail.com	Army Base Comm.	3379
Travis Finch	363 Glenn Lakes	travisfinch@frontier.com	—	—
Tim Rentzel	374 clubhouse Rd	TDd@myiFP.com	ARMY BASE	5613.
Galen Kusic	21 S. Front St.	glin83@yahoo.com	RNH	—
Jack Krebs	234 Crescent Dr	sailor231@frontier.com	ArmyBaseComm	374-1991
Dennis Elliott	116 Riviera Dr Rio Vista CA	DCElliott@HOTMAIL.Com	Self	374-5840
Laurie Oleksiewicz	609 Birch Ridge Dr Rio Vista CA 94571	minmayinc@aol.com	Biotech + Rio Vision	925-301-7389
David Hampton	512 Twin Pines Rio Vista	hamptonfor@gmail.com	City of Rio Vista	707-398-6880

Disclaimer: Before including your name, address, e-mail address or other personal identifying information, please be aware that your name and contact information will be added to the project mailing list and your personal identifying information may be made publicly available at any time. While you can request that your personal identifying information be withheld from public review, DWR and USFWS cannot guarantee that this will be possible.

Delta Research Station

Public Scoping Meeting Sign In Sheet
December 15, 2014 – Rio Vista, CA

Name	Address	Email Address	Organization (optional)	Phone Number (optional)
Angela Gentry Todd	3613 Shelid Rd Bird Landing	backhstrand@gmail.com	Business Owner	707 374 2000
Peggy Schulz	420 S Front St. Rio Vista	peggys@citlink.net	Business Owner	707/ 374-5580
Al Medvitz	P.O. Bx 561 Rio Vista, CA	amedvitz@frontiernet.net	Rancher	707 374-2254
Jeanne McCormack	"	Jeannizmac@ frontiernet.net	"	"
Crista Jones Haynes	740 Beach Dr. Rio Vista, CA. 94571			707 (374) 2449
Carolyn Hespeler	770 Beach Dr.	carolynhespeler@yahoo	resident	374.2986
Bill Mortimore	95 Bruning Ave RV.	bmortimore@gmail.com	"	(707) 249-0664
Mary Ellen Lamothe	60 Highland Dr. RV	maryellenz@frontiernet.net	RV PLAN.com	707 386-9265 cell
Yvette Gault	821 Laurel Way	yvettes319@yahoo.com		

Disclaimer: Before including your name, address, e-mail address or other personal identifying information, please be aware that your name and contact information will be added to the project mailing list and your personal identifying information may be made publicly available at any time. While you can request that your personal identifying information be withheld from public review, DWR and USFWS cannot guarantee that this will be possible.

Delta Research Station

Public Scoping Meeting Sign In Sheet

December 15, 2014 – Rio Vista, CA

Name	Address	Email Address	Organization (optional)	Phone Number (optional)
R. Steve Haynes	740 Beach Dr Rio Vista			(707) 374-2449
Jon Tadena	700 Cinnabar Hills	TADENA 511@AOL.COM		925 354-7355
Brandon Minto	609 Jefferson Street, Fairfield	brandon.minto@mail.house.gov	Congressman Garamendi	530-753-5301
Sean Robinett	821 Laurel Ln	Seanrobinett@netscape.net		

Disclaimer: Before including your name, address, e-mail address or other personal identifying information, please be aware that your name and contact information will be added to the project mailing list and your personal identifying information may be made publicly available at any time. While you can request that your personal identifying information be withheld from public review, DWR and USFWS cannot guarantee that this will be possible.

Delta Research Station

Public Scoping Meeting Sign In Sheet

December 16, 2014 – Stockton, CA

Name	Address	Email Address	Organization (optional)	Phone Number (optional)
JAN VICK	632 MEADOWBROOK LN RIO VISTA 94571	SEAWING JAN@ GMAIL.COM	ARMY BASE STEERING COMM PLANNING	COMM.
GENE VICK	↑ SAME	↑ SAME	ATOD HIGHWAY 12 ASSOC	—
Kathie Kishaba			DWR	916.653.6743

Disclaimer: Before including your name, address, e-mail address or other personal identifying information, please be aware that your name and contact information will be added to the project mailing list and your personal identifying information may be made publicly available at any time. While you can request that your personal identifying information be withheld from public review, DWR and USFWS cannot guarantee that this will be possible.

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Delta Research Station EIR/EIS Scoping
Speaker Card

Name: **Date:**

Comment(s):

Delta Research Station EIR/EIS Scoping
Speaker Card

Name: **Date:**

Comment(s):

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DWR AND USFWS:
DELTA RESEARCH STATION

Draft EIR/EIS - Scoping Comment Form

Name:
Group/Organization (optional):
Mailing Address:
Telephone No. (optional):
Email (optional):

Comments/Issues:

Please use additional sheets if necessary.
Disclaimer: *Before including your name, address, e-mail address or other personal identifying information, please be aware that your name and contact information will be added to the project mailing list and your personal identifying information may be made publicly available at any time. While you can request that your personal identifying information be withheld from public review, DWR and USFWS cannot guarantee that this will be possible.*

SUBMIT WRITTEN COMMENTS (POSTMARKED BY JANUARY 6, 2014) TO:

MAIL: DRS CEQA/NEPA Scoping Comments
California Department of Water Resources
Attn: John Engstrom
1416 Ninth Street, Room 315-3
Sacramento, CA 94236

EMAIL: scoping@deltaresearchstation.com

Questions? Please email us or visit our website: www.deltaresearchstation.com

Place

Stamp

Here

DRS NEPA / CEQA Scoping Comments

California Department of Water Resources

Attn: John Engstrom

1416 Ninth Street, Room 315-3

Sacramento, CA 94236

(fold here)

Tape Here-

Do not staple

Delta Research Station:
Estuarine Research Station and Fish Technology Center

CEQA/NEPA Scoping Meetings

December 15 and 16, 2014

CALIFORNIA DEPARTMENT OF WATER RESOURCES | U.S. FISH AND WILDLIFE SERVICE | CALIFORNIA DEPARTMENT OF GENERAL SERVICES

U.S. FISH & WILDLIFE SERVICE

CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

Horizon WATER and ENVIRONMENT

Welcome and Opening Remarks

Horizon
WATER and ENVIRONMENT

Meeting Agenda

1. Meeting Purpose and Ground Rules
2. Project Overview
3. Overview of California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA)
4. Receive Public Input

Horizon
WATER and ENVIRONMENT

Meeting Purpose – NEPA/CEQA Scoping

Purpose of Scoping: To allow the public and agencies to provide input on the scope and content of the environmental impact analysis.

The scoping period provides 30 days to receive public input.

Scoping comments can include information on:

- ✓ Potential environmental issues
- ✓ Potential mitigation measures
- ✓ Characteristics of the existing environment
- ✓ Resources that may be cumulatively affected

Meeting Ground Rules

- Please silence all cell phones.
- One person speaks at a time; please do not interrupt a speaker.
- Make clear and succinct comments in order for us to effectively capture the comment in notes.
- Be respectful of each other and of differing points of view.

Project Background & Purpose

The Proposed Project would construct a Delta Research Station (DRS). The DRS would provide centralized facilities for the Interagency Ecological Program (IEP). Existing IEP activities would be relocated and consolidated at the DRS.

The IEP provides ecological information and scientific leadership for use in management of the Bay-Delta

Interagency Ecological Program
COOPERATIVE ECOLOGICAL INVESTIGATIONS SINCE 1970

Horizon WATER and ENVIRONMENT

Project Overview

The Delta Research Station consists of two separate but related facilities:

- Estuarine Research Station (ERS)
- Fish Technology Center (FTC)

Horizon WATER and ENVIRONMENT

Project Overview

Objectives

ERS –

- Establish a research station in a central location within the Bay-Delta to facilitate ease of conducting monitoring and research; and
- Co-locate the research station with a facility capable of studying fish in captivity (i.e., the FTC); and.
- Provide facilities to conduct monitoring and research on the Bay-Delta's aquatic resources.

FTC –

- Develop captive propagation technologies for the Bay-Delta's rare fish species;
- Test and refine the captive propagation techniques;
- Locate the facility where suitable water quality and quantity are available, and ability to discharge waste water given its various functions and operations is available; and
- Co-locate the FTC with a facility conducting conservation research on Bay-Delta rare fish species (i.e., the ERS).

Horizon WATER and ENVIRONMENT

Project Overview

Project Components

ERS facilities:

- Office and work space
- Wet and dry laboratory facilities
- Warehouse and boat storage space
- Marina
- Vehicle and boat repair shop

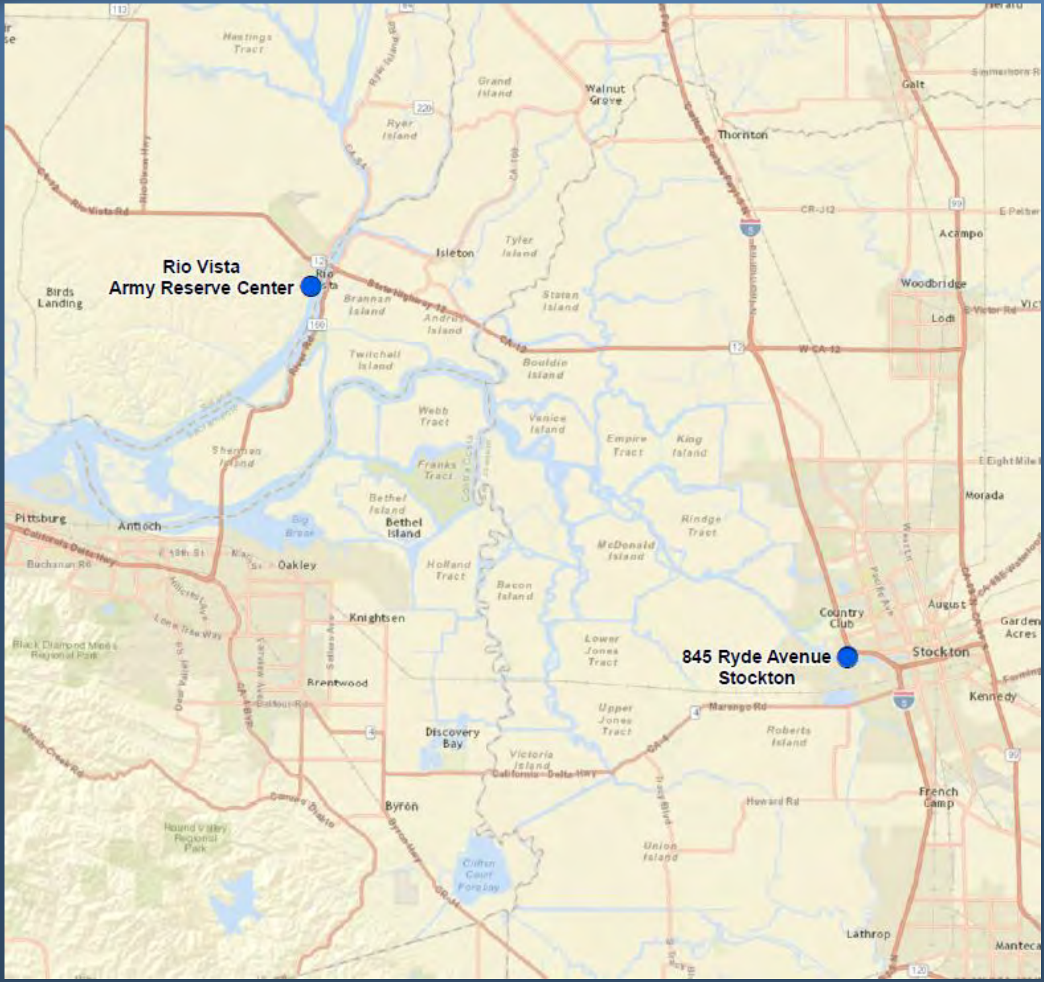
FTC facilities:

- Fish tanks
- Office and administration building
- Shop and vehicle storage building
- Water treatment facility
- Effluent treatment facility

Project Overview
Alternative Sites

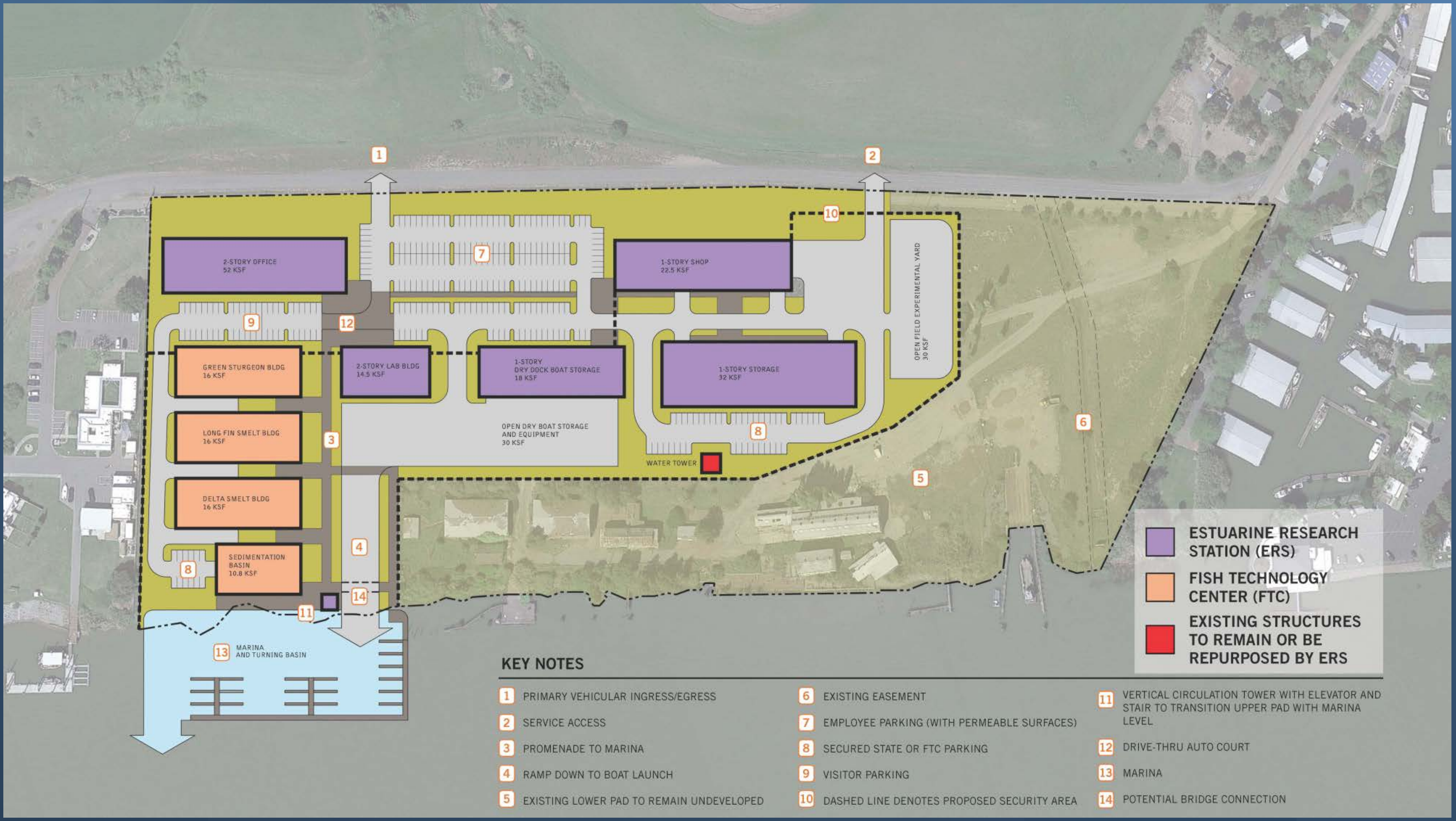
Sites under Consideration:

- Rio Vista Army Reserve Center
- 845 Ryde Ave, Stockton



Rio Vista Army Reserve Center

Configuration 1



Horizon WATER and ENVIRONMENT

Rio Vista Army Reserve Center

Configuration 2

Horizon WATER and ENVIRONMENT

845 Ryde Ave, Stockton

Horizon WATER and ENVIRONMENT

CEQA/NEPA Requirements

California Environmental Quality Act (CEQA) requires:

- Environmental review and public disclosure for discretionary actions conducted by public agencies
- Disclosure of potential environmental impacts
- Identification of mitigation measures and project alternatives to potentially reduce or avoid these impacts

National Environmental Policy Act (NEPA) requires:

- Disclosure of environmental impacts and benefits of proposed action and alternatives

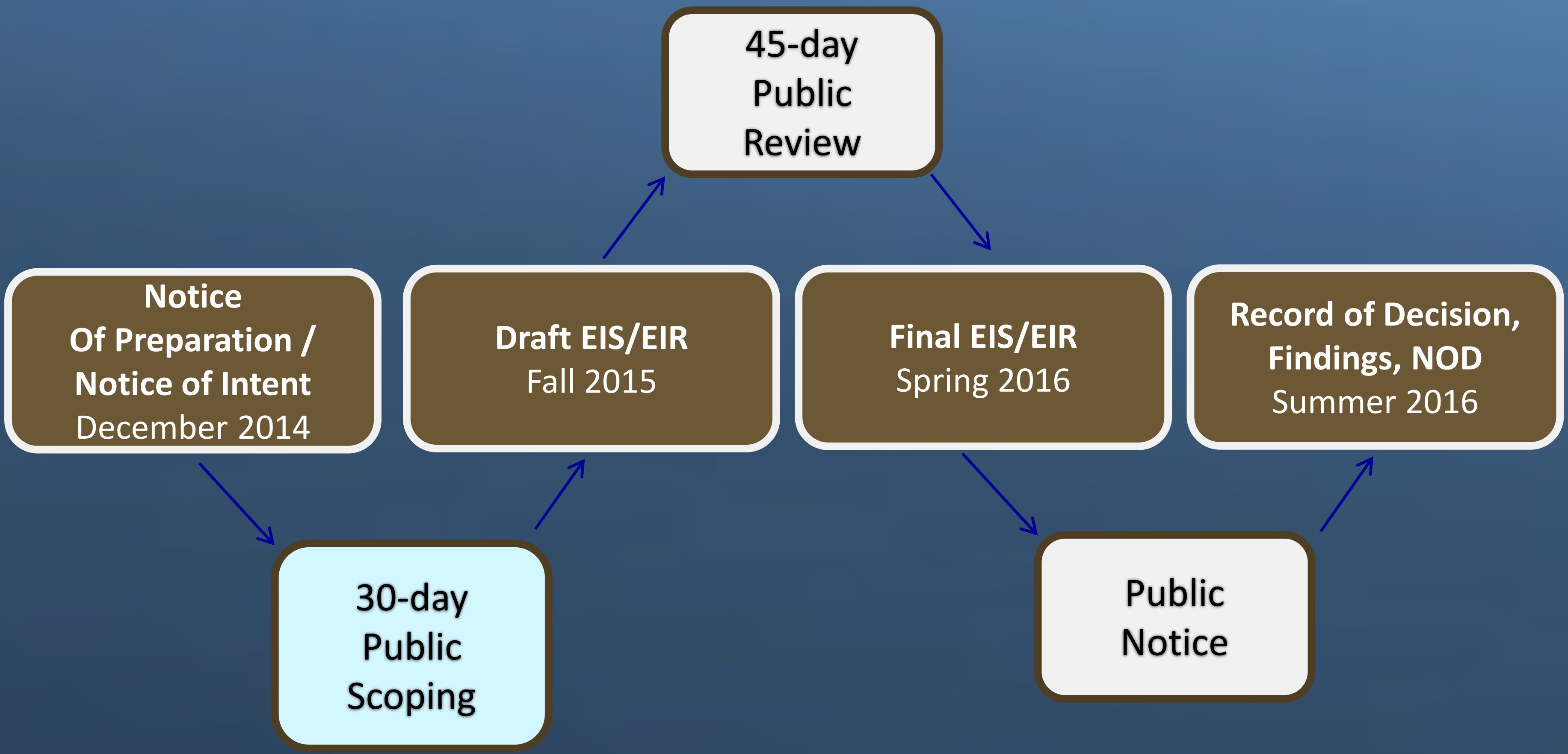
Horizon WATER and ENVIRONMENT

Environmental resources evaluated for CEQA/NEPA

- ✓ Aesthetics
- ✓ Air quality
- ✓ Biological resources
- ✓ Cultural resources
- ✓ Geology and soils
- ✓ Greenhouse gas emissions
- ✓ Hazards and hazardous materials
- ✓ Hydrology and water quality
- ✓ Land use
- ✓ Noise
- ✓ Recreation
- ✓ Transportation/traffic
- ✓ Public services
- ✓ Utilities
- ✓ Environmental justice
- ✓ Socio-economics
- ✓ Cumulative impacts

Horizon
WATER and ENVIRONMENT

CEQA/NEPA Process and Schedule



Purpose of Scoping

To provide the public and agencies to provide input on the scope and content of the environmental impact analysis.

Scoping comments can include information on

- ✓ Potential environmental issues
- ✓ Potential mitigation measures
- ✓ Characteristics of the existing environment
- ✓ Resources that may be cumulatively affected

Horizon WATER and ENVIRONMENT

How to Comment after Today

Comments will be accepted until:

5:00 pm on January 6, 2015

Send written comments to:

California Department of Water Resources

Attn: John Engstrom

1416 Ninth Street, Room 315-3

Sacramento, CA 94236

Email: scoping@deltaresearchstation.com

Subject Line: DRS CEQA/NEPA Scoping Comments

Include name, address, contact number, and email address for future correspondence related to this CEQA and NEPA Process

Horizon WATER and ENVIRONMENT

Thank you

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Welcome to the
Delta Research Station
CEQA/NEPA Public Meetings

California Department of Water Resources

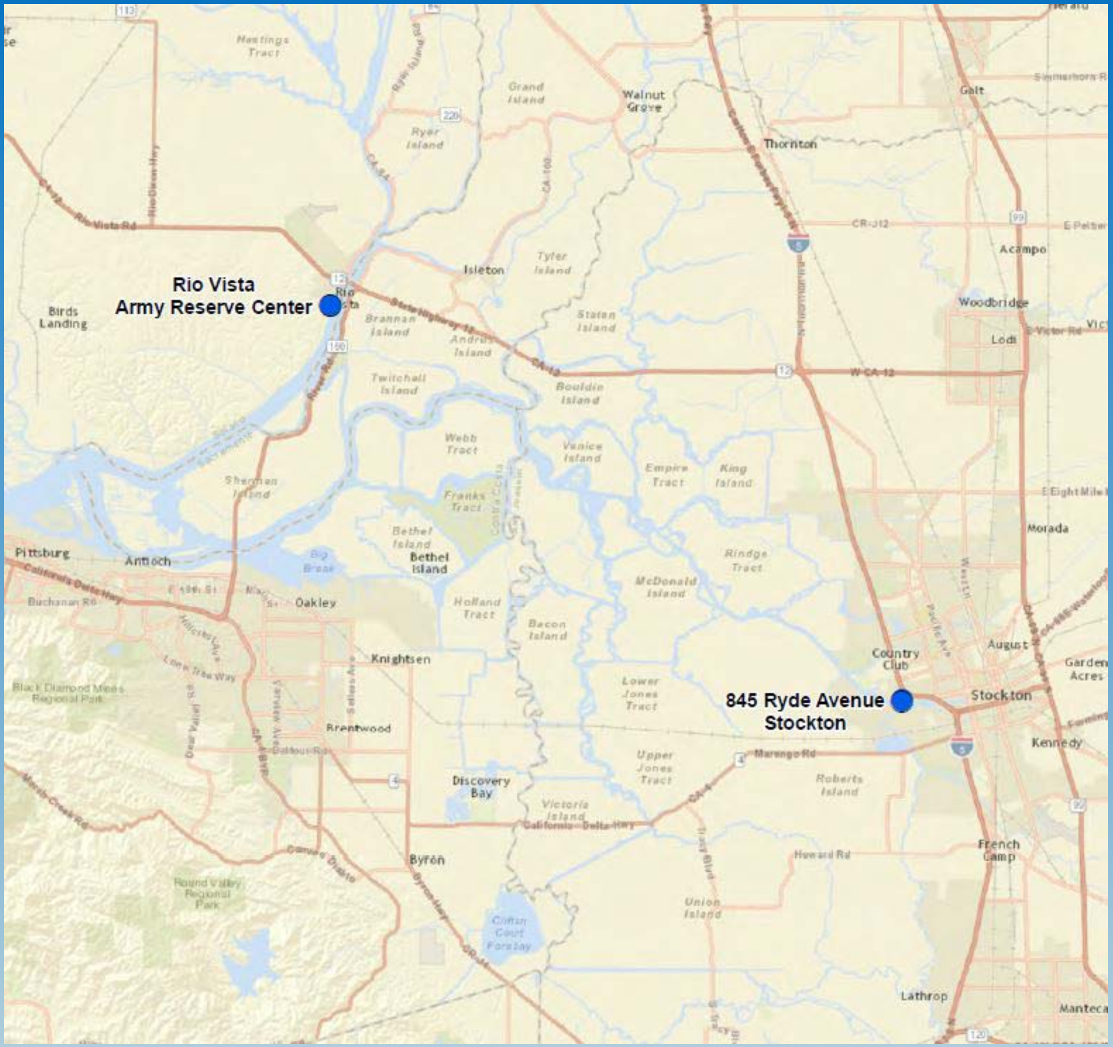
U.S. Fish and Wildlife Service

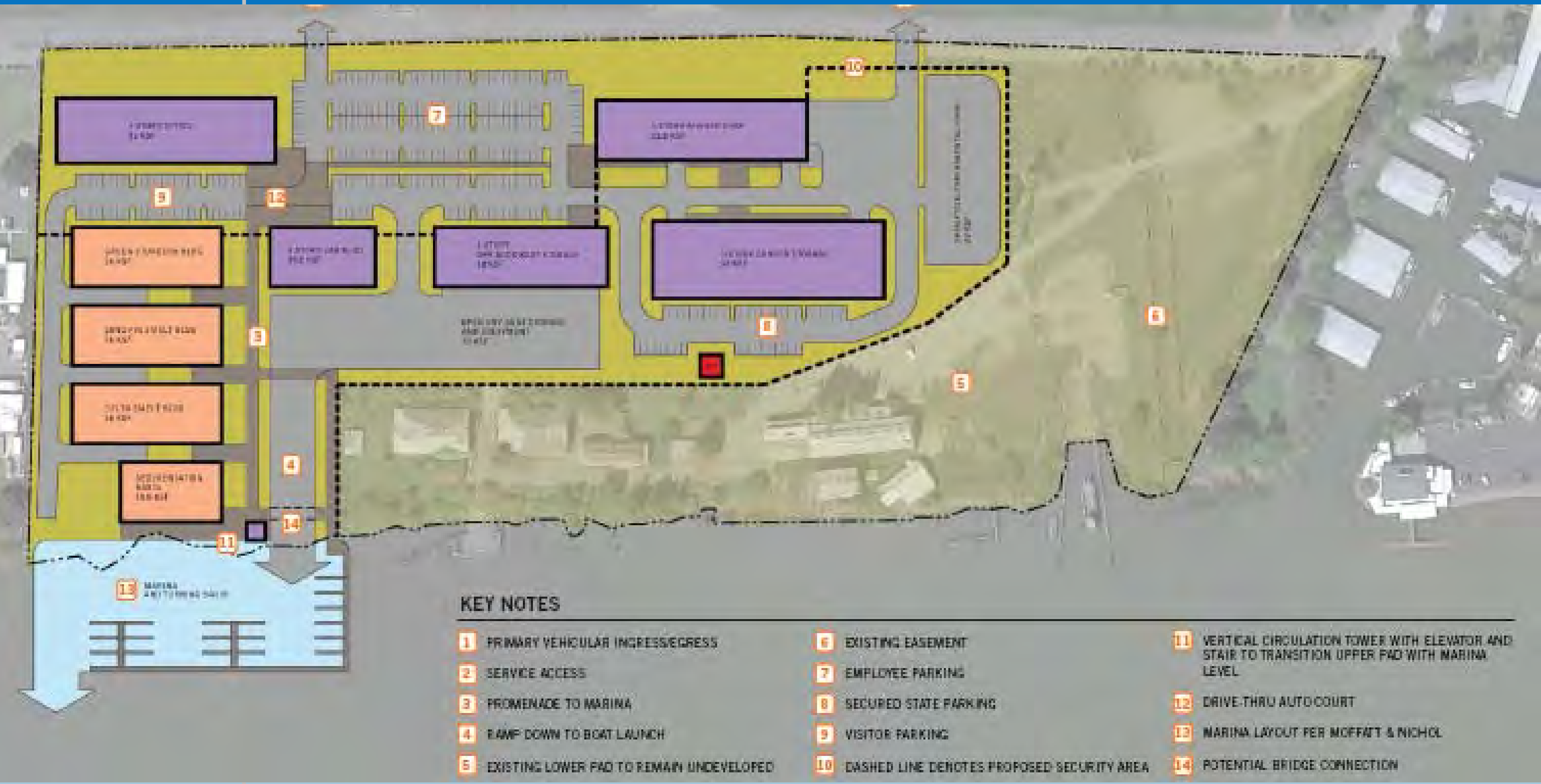
SIGN-IN / ORIENTATION

- All Guests Sign-in Here
- Information, Handouts, and Comment Cards for Tonight's Meeting

Sites Under Consideration

- Rio Vista Army Reserve Center
- 845 Ryde Ave, Stockton



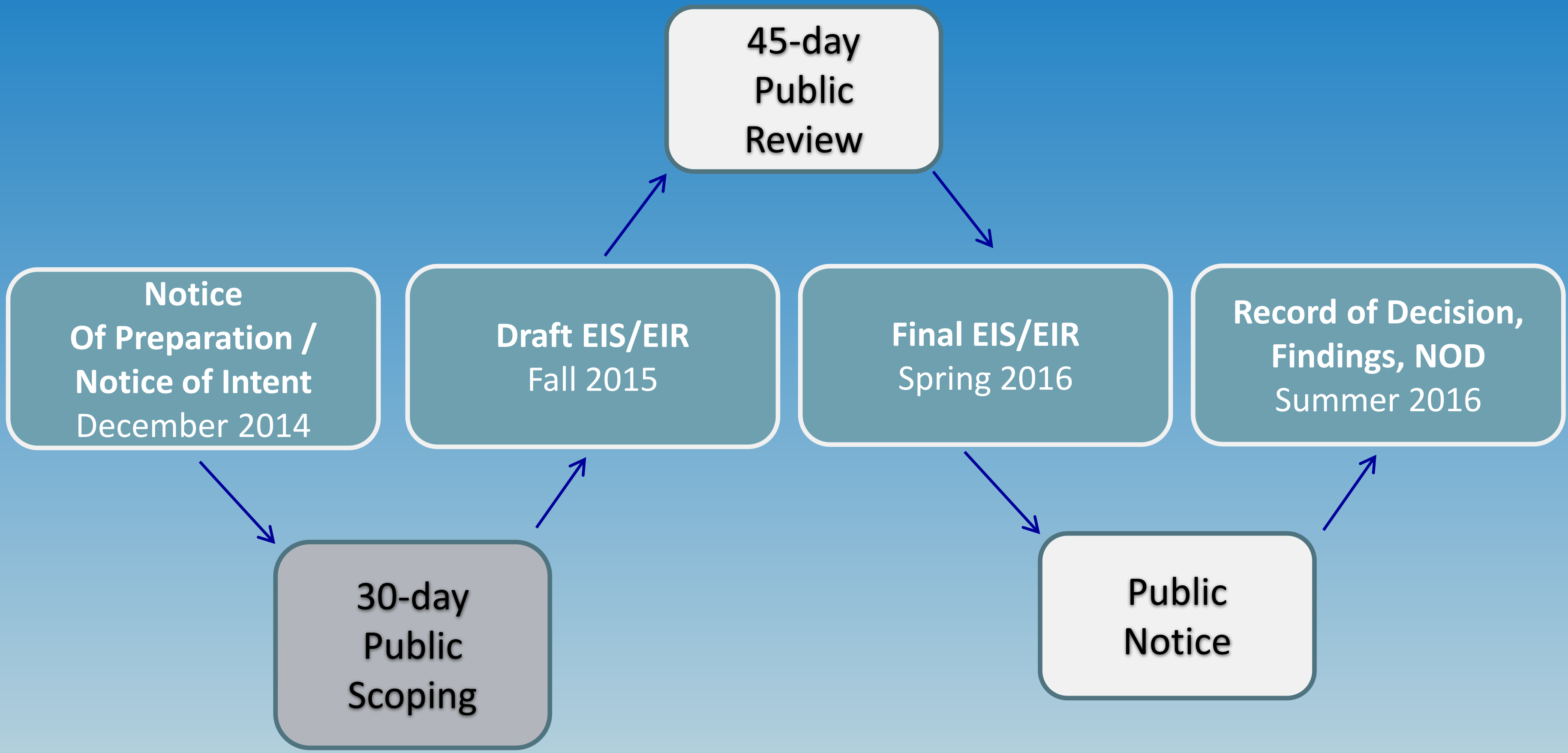


RIO VISTA ARMY RESERVE CENTER
Configuration 1

RIO VISTA ARMY RESERVE CENTER
Configuration 2

845 Ryde Ave, Stockton

CEQA/NEPA Process and Schedule



PUBLIC REVIEW PROCESS

SCOPING COMMENT SUBMITTAL

- Please provide input regarding the scope of the EIR/EIS on the comment cards provided.

- Or mail your comment card before the deadline:

  California Department of Water Resources

  Attn: John Engstrom

  1416 Ninth Street, Room 315-3

  Sacramento, CA 94236

- Or Email your comments to: **scoping@deltaresearchstation.com**

Visit the Program Website: **www.deltaresearchstation.com**

COMMENTS DUE JANUARY 6, 2015

Appendix C
COMMENTS RECEIVED ON THE NOTICE OF PREPARATION AND NOTICE OF INTENT

This appendix contains copies of the written comments received on the Notice of Preparation (NOP) and Notice of Intent (NOI) during the public scoping period. This appendix also contains the speaker cards from the Rio Vista scoping meeting that occurred on December 15, 2014.

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STATE OF CALIFORNIA – CALIFORNIA NATURAL RESOURCES AGENCY **EDMUND G. BROWN JR., GOVERNOR**

CENTRAL VALLEY FLOOD PROTECTION BOARD
3310 El Camino Ave., Rm. 151
SACRAMENTO, CA 95821
(916) 574-0609 FAX: (916) 574-0682
PERMITS: (916) 574-2380 FAX: (916) 574-0682

December 23, 2014

Mr. John Engstrom
California Department of Water Resources
1416 Ninth Street, Room 315-3
Sacramento, California 94236

Subject: CEQA Comments: Delta Research Station, Notice of Preparation, SCH Number: 2014122017

Location: Solano and / or San Joaquin County

Dear John:

Central Valley Flood Protection Board (Board) staff has reviewed the subject document and provides the following comments:

The proposed project locations are adjacent to the Sacramento and San Joaquin Rivers which are under Board jurisdiction. The Board enforces its Title 23, California Code of Regulations (23 CCR) for the construction, maintenance, and protection of adopted plans of flood control that protect public lands from floods. Adopted plans of flood control include federal-State facilities of the State Plan of Flood Control, regulated streams, and designated floodways. The geographic extent of Board jurisdiction includes the Central Valley, and all tributaries and distributaries of the Sacramento and San Joaquin Rivers, and the Tulare and Buena Vista basins (23 CCR, Section 2).

Pursuant to 23 CCR a Board permit is required prior to working in the Board's jurisdiction for the following:

- Placement, construction, reconstruction, removal, or abandonment of any landscaping, culvert, bridge, conduit, fence, projection, fill, embankment, building, structure, obstruction, encroachment, excavation, the planting, or removal of vegetation, and any repair or maintenance that involves cutting into the levee (23 CCR Section 6);

- Existing structures that predate permitting, or where it is necessary to establish the conditions normally imposed by permitting. The circumstances include those where responsibility for the encroachment has not been clearly established or ownership and use have been revised (23 CCR Section 6);

- Vegetation plantings require submission of detailed design drawings; identification of vegetation type; plant and tree names (both common and scientific); quantities of each type of plant and tree; spacing and irrigation method; a vegetative management plan for maintenance to prevent the interference with flood control operations, levee maintenance, inspection, and flood fight procedures (23 CCR Section 131).

Other local, federal and State agency permits may be required and are the responsibility of the applicant to obtain.

Board permit application forms and our complete 23 CCR regulations can be found on our website at http://www.cvfpb.ca.gov/. Maps of the Board's jurisdiction including all tributaries and distributaries of the Sacramento and San Joaquin Rivers, and Board designated floodways are also available on a Department of Water Resources website at http://gis.bam.water.ca.gov/bam/.

Additional Considerations Related to Potential Impacts of Vegetation and Hydraulics

Accumulation and establishment of woody vegetation that is not managed may have negative impacts on channel capacity and may increase the potential for levee over-topping or other failure. When vegetation develops and becomes habitat for wildlife, maintenance to initial baseline conditions typically becomes more difficult as the removal of vegetative growth may be subject to federal and State resource agency requirements for on-site mitigation. The proposed project should include mitigation measures to avoid decreasing floodway channel capacity.

Adverse hydraulic impacts of proposed encroachments could impede flood flows, reroute flood flows, and/or increase sediment accumulation. The proposed project should include mitigation measures for channel and levee improvements and maintenance to prevent and/or reduce hydraulic impacts. If possible off-site mitigation outside of the Board's jurisdiction should be used when mitigating for vegetation removed at the project location.

If you have any questions please contact Mr. James Herota by telephone at (916) 574-0651, or by email at james.herota@water.ca.gov.

Sincerely,

Len Marino

Len Marino, P.E.
Chief Engineer

cc: Governor's Office of Planning and Research
State Clearinghouse
1400 Tenth Street, Room 121
Sacramento, California 95814

STATE OF CALIFORNIA
ALIFORNIA NATURAL RESOURCES AGENCY
L VALLEY FLOOD PROTECTION BOARD
3310 EL CAMINO AVENUE, ROOM 151
SACRAMENTO, CA 95821

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Mr. John Engstrom
California Department of Water Resources
1416 Ninth Street, Room 315-3
Sacramento, California 94236

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CITY OF RIO VISTA
One Main Street, Rio Vista, California 94571
Phone: 707-374-6451 Fax: 707-374-5063

January 8, 2015

DRS NEPA/CEQA Scoping Comments
California Department of Water Resources
Attn: John Engstrom, Supervising Architect
1416 Ninth Street, Room 315-3/P.O. Box 942836
Sacramento, CA 94236-0001

Re:Scoping Comments on Delta Research Station (DRS) EIR/EIS

Dear Mr. Engstrom:

Several members of the Rio Vista Army Base Steering committee attended the December 15 and 16 scoping meetings in Rio Vista and Stockton, and on January 5, 2015, the Steering Committee reviewed the alternatives prepared for the Delta Research Station. We offer the following comments on the scope of the Draft EIR and EIS, with respect to the Rio Vista Army Base sites:

<u>General Comments:</u>

We understand that the project description is necessarily conceptual at this stage, but we are concerned that lack of specificity in some areas may result in a exaggeration of the project's impact. The project description should incorporate the concepts discussed in Chapter 3, Standards and Guidelines, of the Army Base District Design Guidelines, and consider the suggestions relating to land use, circulation, historic resources, river access, edge treatment, setbacks, views, visual amenities, landscape and site design, building design and sustainability.

It should acknowledge that the project will include an initial phase, a second phase (Fish Tech Center), and a third phase of development for community educational and recreational use, and be much clearer with respect to the assumptions about acreage assigned to each.

The document should take note of the many previous proposals, studies, evaluations, and restrictions conducted for and placed on the Rio Vista Army Base site including the Rio Vista Army Base Reuse Plan, the Finding of Suitability to Transfer the U.S. Army Base Reserve Center to the City of Rio Vista, the 2003 Quitclaim Deed, the Army Base Reserve Center Redevelopment Plan, the Army Base District Design Guidelines, the Rio Vista Army Base Zone District and the MOUs between the City of Rio Vista, DWR and USFWS. It should also include the status of and the pending recommendations from the Rio Vista City Engineer regarding the complete closure of the existing water supply well in the Draft EIR and EIS and necessary mitigation measures.

We assume that the final EIR/EIS will provide documentation of previous clean-up efforts made by the Army and certifications made by state or federal monitoring agencies should be described. This would include measures previously conducted including removal of contaminated soils, removal of former deteriorated buildings and underground storage tanks. It should include the status of and the pending recommendations from the Rio Vista City Engineer regarding the complete closure of the existing water supply well in the Draft EIR and EIS. Discussion of joint city-project infrastructure needs should be included.

Mitigations should include measures to minimize construction traffic impacts on the adjacent neighborhoods Traffic counts and vehicular modeling should be conducted at key intersections such as Second Street/Beach Drive, Highway 12/Front Street/Main Street, and Highway 12/113 (if Montezuma Hills Road is considered as a truck route for construction traffic coming from the Fairfield and Vacaville areas). It should be recognized, however, that construction impact will be temporary. Due to its climate and topography, many Rio Vista residents are able to use walking, bicycling and the Delta Breeze transportation system as alternatives to private auto use, and these alternatives would be available to occupants of the site as well.

Comments regarding Configuration 1

The ABSC prefers the Configuration 1 Plan (including the marina and turning basin located in the Sacramento River). As mentioned above, and will be further discussed in Alternative 2, the project documentation is vague as to acreage allotments, and should include clearer scaled site planning for the entire 28-acre Rio Vista Army Base Site. A scaled site plan should include the major elements proposed in the Army Base District Design Guidelines. This would include adjacent roads, waterways and adjoining uses; the approx. total land acreage for each phase (identifying the proposed location of the 5 acre Fish Technology Center), total square feet of building area; square footage and percentage of building coverage and landscaping/open space for each phase, and the number of parking spaces proposed for each phase. This should include re-consideration of the area shown as shared parking for public use, which is located well away from the designated public areas. We hope that the design will minimize the overall pavement area by using turf block, bio swales, and designated carpool/vanpool spaces as well as joint use of parking areas.

The Rio Vista Army Base site plan should assure waterfront access for the public, passive recreation and locations for an interpretive center and incidental retail uses over the projected three phases and incorporate additional major elements proposed in the adopted City of Rio Vista's Army Base Design Guidelines. We want a campus-like atmosphere, using substantial internal landscaping and 2-story buildings (wherever possible) for the approximately 10-12 acre Estuarine Research Station. Other infrastructure needs and the potential reuse of existing buildings will also affect the environmental impact of the project, and we hope those topics will be more fully developed in the final draft.

Comments Regarding Configuration 2:

The site plan presented as Configuration 2 appears to require more acreage than the 15-17 acres described. Since we have been told that the drawing is to scale, we are unable to reconcile the visual representation with the acreage described. Further, the acreage remaining for the city's use is separated into two disjoint halves. The City's space does not include any existing buildings, thus making us entirely dependent on the developer's decisions with respect to historical and cultural impact.

The only point of city acreage touching the river would be a narrow triangle which is well above water level. This plan provides no actual public river access. Additionally, the proposed marina intrudes on current open space, with substantial impact on wildlife and habitat as well as on wildlife viewing, educational interpretation opportunities, and other passive recreation uses. Similarly, project utilization of the entire waterfront "industrializes" the site and reduces wildlife habitat and visitor views. From across the river the site would look like warehouses or a light industrial plant, rather than the "campus" the Design Guidelines envision.

The city has designed a looped, pedestrian "Bridge to Beach" Pathway as a future recreation amenity. This path is also important to enhancement the city's visual presence, and attractiveness to visitors. While the presence of secured space for the DWR and for the Coast Guard will prevent this path from entirely following the riverbank, the configuration of Alternative 2 reduces the effective length of this path and restricts the possibility of a loop. This would have negative social, educational and recreational impacts.

This alternative does not appear to meet the goals of the city, the Design Guidelines, or the guidelines of the EIR/EIS process.

In summary, the committee regards the alternatives presented as unduly vague in the amount of acreage assumed. Within the bounds of planning at a conceptual level, the committee urges as much specificity as possible with respect to infrastructure needs, site layout, building design, and potential building re-use, to avoid "worst-case" assumptions about impacts. The committee finds Alternative 2 inferior to Alternative 1 on relevant environmental criteria.

We look forward to further reviewing the draft environmental documents. If you have any questions, please contact me or Dan Christians, Adjunct Staff Member, (707) 580-0905 (cell).

Sincerely yours,

Jan Vick

Jan Vick, Chair
Rio Vista Army Base Steering Committee

Cc: Rio Vista Mayor and City Council
Rio Vista Army Base Steering Committee Members
City Manager
Dan Christians, Adjunct Staff Member

Army Base Steering Committee
City of Rio Vista
1 Main Street
Rio Vista, CA 94571

DEPARTMENT OF
WATER RESOURCES
SACRAMENTO

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OAKLAND CA 945

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DRS NEPA/CEQA Scoping Comments
California Department of Water Resources
Attn: John Engstrom, Supervising Architect
1416 Ninth Street, Room 315-3/P.O. Box 942836
Sacramento, CA 94236-0001

94236O001

Jean Public

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From:	Beggs, Barbara
To:	Engstrom, John@DWR; Parson,Jennifer@DGS; Robert Clarke; Michael Stevenson; Sommer, Ted@DWR; O"Brien, Daniel@DGS; Kevin Fisher; Tom Engels; Bowen, Robert@DGS; Allison Chan
Subject:	DRS public scoping comment
Date:	Monday, December 15, 2014 8:47:54 AM

Our first public scoping comment below.

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Barbara Beggs
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service, Bay-Delta Office
650 Capitol Mall, Suite 8-300; Sacramento, Ca 95691
916-930-5637; barbara_beggs@fws.gov

---------- Forwarded message ----------
From: **Jean Public** <jeanpublic1@yahoo.com>
Date: Sun, Dec 14, 2014 at 7:44 AM
Subject: Fw: cpublic comment on federal register - there is no regulations.gov webiste avilable for comment
To: "barbara_beggs@fws.gov" <barbara_beggs@fws.gov>, "vicepresident@whitehouse.gov" <vicepresident@whitehouse.gov>, "agsec@usda.gov" <agsec@usda.gov>, "americanvoices@mail.house.gov" <americanvoices@mail.house.gov>, "info@peta.org" <info@peta.org>, "info@taxpayer.net" <info@taxpayer.net>, "media@cagw.org" <media@cagw.org>, "info@njtaxes.org" <info@njtaxes.org>

the american public needs to insist on cutting spending at this agency, which spends in an oiut of control wasy. we dont need either of these projects at this time. we alrady spend trillions of dollars on researchand it results in no more animals being alive since this agency allows endless killing of species to take place. there is no protection issuing from this agency to protect the wildliffe which is being exterminated at a great rate and leaving our world much poorer. the guy who runs fws is a wildlife murderer, hardly a fit person to manage this agency. the gfun wackos are in control at this agency. we spend too much and get nothing for our money. i oppose this porject terribly. this agency deserves an f minus for protcting all species. iits budget should be cut. this comment is for the public rcord. this agency is ineffective. this comment is for the public record. please receipt. jean public jeanpublic1@yahoo.com

they also didnot register this proposal with regulations.gov and i have notified regulations.gov of my attempts to comment via that method.

to take place. t
Federal Register Volume 79, Number 237 (Wednesday, December 10, 2014)]
[Notices]
[Pages 73332-73333]
From the Federal Register Online via the Government Printing Office [www.gpo.gov]
[FR Doc No: 2014-28891]

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DEPARTMENT OF INTERIOR

Fish and Wildlife Service

[FWS-R8-FAC-2014-N224]

Notice of Intent To Conduct Public Scoping and Prepare an Environmental Impact Statement/Environmental Impact Report Regarding the Delta Research Station--Estuarine Research Station and Fish Technology Center Project

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of intent.

SUMMARY: Pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, and the California Environmental Quality Act (CEQA) and State CEQA Guidelines, the U.S. Fish and Wildlife Service (USFWS) and the California Department of Water Resources (DWR) intend to prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/EIR) to evaluate impacts regarding construction and operation of the Delta Research Station (DRS) in the San Francisco Bay/Sacramento-San Joaquin Delta Estuary (Bay-Delta), California. The planned DRS would consist of two facilities, a proposed Estuarine Research Station (ERS) and Fish Technology Center (FTC). The USFWS will be the lead Federal agency responsible for coordinating the environmental analysis for the proposed action under NEPA. DWR will be the lead State agency responsible for coordinating the environmental analysis under CEQA. With this notice, USFWS and DWR are announcing the beginning of the scoping process to solicit public comments and identify issues.

DATES: This notice initiates the public scoping processes for the EIS/EIR. Comments on issues must be submitted in writing and postmarked January 9, 2015. Two scoping meetings will be held during the scoping period, one in Rio Vista and one in Stockton. The dates and locations of these scoping meetings will be announced at least 15 days in advance through the project Web site at www.deltaresearchstation.com.

ADDRESSES: Comments and requests for information related to the preparation of the EIS/EIR should be sent to USFWS, Attn: Barbara Beggs, 650 Capitol Mall Suite 8-300, Sacramento, CA 95691; and/or emailed to barbara_beggs@fws.gov.

FOR FURTHER INFORMATION CONTACT: Barbara Beggs, USFWS, at 916-930-5637.

SUPPLEMENTARY INFORMATION:

Overview of the DRS

USFWS and DWR are currently planning development of the DRS, a science and research center in the Bay-Delta, which would consolidate a number of existing and new activities into the proposed ERS and FTC and bring together Federal and State agency staff working on similar Bay-Delta issues.

Project Purpose

The purpose of the DRS is to enhance interagency coordination and collaboration by developing a shared research facility. The DRS would advance the interests of researchers, local communities, and others that are dependent on the Bay-Delta. The DRS is needed because current Federal and State agency staff working on similar Bay-Delta issues are spread out in different locations, located in areas remote from the Bay-Delta, or have limited resources, inhibiting efficient research and monitoring efforts and collaboration.

The specific objectives of each component of the DRS are as follows:

ERS-- [cir] Establish a research station in a central location within the Bay-Delta to facilitate ease of conducting monitoring and research; and [cir] Co-locate the research station with a facility capable of studying fish in captivity (i.e., the FTC); and [cir] Provide facilities to conduct monitoring and research on the Bay-Delta's aquatic resources. FTC-- [cir] Develop captive propagation technologies for the Bay-Delta's rare fish species; [cir] Test and refine the captive propagation techniques; [cir] Locate the facility where suitable water quality and quantity are available, and ability to discharge waste water given its various functions and operations is available; and [cir] Co-locate the FTC with a facility conducting conservation research on Bay-Delta rare fish species (i.e., the ERS). Proposed Action and Alternatives At this time, USFWS and DWR are proposing development of the ERS and FTC, as these facilities would be co-located with one another and potentially built at the same time. Collectively, these facilities are referred as the proposed action. Currently, three potential alternatives plus the no action/no project alternative are being considered for the proposed ERS and FTC. The first two potential alternatives involve locating the facilities at the Rio Vista Army Base in the City of Rio Vista, with each alternative representing a different site configuration within the base. The third alternative is to locate the facilities in the City of Stockton, California. All alternatives would be evaluated at an equal level of detail in the EIS/ EIR. Below is a description of the two proposed facilities. Proposed Facilities The ERS would be a center for research and study of the Bay-Delta ecosystem. The ERS would provide improved and additional facilities for science and research activities and would consolidate over 160 State and Federal employees from the Interagency Ecological Program (IEP). The IEP is a multi-agency cooperative effort to provide ecological information to support management of the Bay-Delta. The IEP monitors, researches, models, and synthesizes critical information in the Bay- Delta to support water management and planning and protection of fish and aquatic ecosystems. ERS facilities would include office and workspace, wet and dry laboratory facilities, warehouse and boat storage space, a marina, and a vehicle and boat repair shop. Laboratory facilities would include optical equipment (e.g., microscopes), fume hoods, computer stations, and water tanks of various sizes for processing of field samples and experimental studies of fish and ecology. The ERS would also include a dry electrical lab to house electronic sensing, monitoring, and telecommunications equipment used to monitor tagged fish and the estuarine environment. The ERS would be managed by DWR. The FTC would be a center for propagation, research, conservation, and study of rare Bay-Delta fishes. The FTC is also intended to house and maintain a refugial population of rare fish species (i.e., captively raised fish). The FTC would include research and study facilities, an office and administration building, a shop and vehicle storage building, a water treatment facility for surface water, and an effluent treatment facility. The FTC would include separate aquaculture and research components for individual study species and a laboratory space to support water quality, genetic, and fish health analysis. The FTC would be managed by USFWS and would be sited immediately adjacent to the ERS. Statutory Authority NEPA (42 U.S.C. 4321 et seq.) requires that Federal agencies conduct an environmental analysis of their [[Page 73333]] proposed actions to determine if the actions may significantly affect the human environment. Under NEPA and its implementing regulations (40 CFR 1500 et seq.), a reasonable range of alternatives to the proposed action is developed and considered in the EIS/EIR. In addition, the EIS/EIR will identify potentially significant direct, indirect, and cumulative effects, and possible mitigation for those significant effects on environmental issues that could occur with implementation of the proposed action. Identification of Environmental Issues The EIS/EIR will evaluate potential environmental impacts from the ERS and FTC. This notice is intended to inform agencies and the public of the potential environmental impacts of the facilities, and to solicit comments and suggestions for consideration in the preparation of the EIS/EIR. To help the public frame its comments, the following is a list of several potential environmental issues that USFWS and DWR have identified for analysis: 1. Aesthetics 2. Air Quality and Greenhouse Gas Emissions 3. Biological Resources--Terrestrial 4. Biological Resources--Fisheries 5. Cultural Resources 6. Geology and Soils 7. Hazards and Hazardous Materials 8. Hydrology and Water Quality 9. Land Use and Planning 10. Noise 11. Population and Housing 12. Public Services, Utilities, and Energy 13. Socioeconomics and Environmental Justice 14. Traffic and Transportation Request for Comments Environmental review of the EIS/EIR will be conducted in accordance with the requirements of NEPA (42 U.S.C. 4321 et seq.), its implementing regulations (40 CFR parts 1500-1508), other applicable regulations, and the USFWS' procedures for compliance with those regulations; and according to the requirements of CEQA (PRC Section 21000 et seq.) and State CEQA Guidelines (California Code of Regulations Title 14 Section 15000 et seq.). This notice is being furnished in accordance with 40 CFR 1501.7 and 1508.22 to obtain suggestions and information from interested agencies, organizations, Native American Tribes, and members of the public on the scope of issues and alternatives that will be addressed in the EIS/EIR. The primary purpose of the scoping process is to identify important issues raised by the public related to development of the proposed action. Written comments from interested parties are invited to ensure that the full range of issues related to the development of the proposed action is identified. Comments during this stage of the scoping process will only be accepted in written form. All comments received, including names and addresses, will become part of the official administrative record and may be made available to the public. Public Availability of Comments Before including your address, phone number, email address, or other personal identifying information in your comment, you should be aware that your entire comment--including your personal identifying information--may be made publicly available at any time. While you can ask us in your comment to withhold your personal identifying information from public review, we cannot guarantee that we will be able to do so. Next Steps After this scoping process, USFWS and DWR will review public comments and then prepare and make publicly available a draft EIS/EIR for comment. Alexandra Pitts, Deputy Regional Director, Pacific Southwest Region, Fish and Wildlife Service. [FR Doc. 2014-28891 Filed 12-9-14; 8:45 am] BILLING CODE P

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From: Amy Spitzer [mailto:aspitzer@sjgov.org]
Sent: Tuesday, January 6, 2015 2:06 PM
To: scoping@deltaresearchstation.com
Cc: Firoz Vohra
Subject: San Joaquin County Public Works Comments to NOP of a Draft EIR/EIS for the Delta Research Station

Good afternoon, Mr. Engstrom.

The San Joaquin County Department of Public Works has reviewed the Notice of Preparation for the above referenced project and has no comments at this time. However, the County does request to be included on the circulation list for any additional project documents.

Thank you for the opportunity to review and comment.

Amy Spitzer
Associate Planner

San Joaquin County Public Works – Transportation Engineering Division
PO Box 1810, Stockton CA 95201
Tel: (209) 468-8494; Fax: (209) 468-2999
aspitzer@sjgov.org

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THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

VIA EMAIL AND US MAIL

January 9, 2015

U.S. Fish and Wildlife Service
Attention: Barbara Beggs
650 Capitol Mall, Suite 8-300
Sacramento, CA 95691

Dear Ms. Beggs:

Notice of Intent to Prepare an Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Regarding the Delta Research Station—Estuarine Research Station and Fish Technology Center Project in the San Francisco Bay/Sacramento- San Joaquin Delta Estuary

The Metropolitan Water District of Southern California (Metropolitan) has reviewed the Notice of Intent (NOI) prepared by the two lead agencies, U.S. Fish and Wildlife Service and California Department of Water Resources, to comply with the National Environmental Policy Act and the California Environmental Quality Act, respectively. As proposed, a two-facility complex would be built in a central location in northern California to consolidate ongoing federal and state scientific research throughout the Bay Delta region. This letter contains Metropolitan's comments on the NOI as a stakeholder and potentially affected public agency.

Southern California has an important stake in the Bay Delta region. Metropolitan has invested significantly into the State Water Project (SWP), and will continue to do so. Even with the diversification of its supply sources, the SWP will remain a critical source of water supply for Metropolitan's service area. Given the importance of the Bay Delta to Metropolitan and other SWP contractors, Metropolitan is engaged in key studies, debates, and decision-making regarding Delta policy. Metropolitan's Board of Directors approved key Delta policy principles and a Delta Action Plan Framework in 2006 and 2007, which provide the foundation for Metropolitan to support the process of planning and implementing the proposed project:

> "**12. Promote an Open, Collaborative Public Process:** Development, funding, and implementation of the long-term Delta Vision should be developed through an open, collaborative public process. Any statutory, regulatory, or funding components of the plan should reflect the outcome of the collaborative process among entities that will be expected to contribute to the plan.
>
> **13. Base All Actions on Sound and Comprehensive Science:** All near-term and long-term actions implemented pursuant to the plan, including environmental restoration actions, investments in new surface and groundwater storage, and improvements in the means of moving water to the SWP, CVP [Central Valley Project], and all other users of supply, should be based on sound, objective and comprehensive science and technical information."

In the spirit of support, it is imperative that all scientific and technical conclusions are subjected to impartial and objective peer-review by nationally or internationally qualified and recognized scientists and/or technicians. Sound science must be the basis to pursue comprehensive solutions to the environmental challenges in the Delta. By having government scientists work in integrated locations, many benefits can be gained including: efficiency in use of resources, staffing, and funds; reduction in duplicative efforts; increased collaboration; and more opportunities to reach out beyond governmental jurisdictions to partner with investigators both nationally and internationally to pursue unbiased scientific inquiry. When analyzing a reasonable range of alternatives in the environmental documentation, the lead agencies are encouraged to consider sites that will attract the best scientists, provide opportunities for government scientists to interact with academic resources and centers, and to be available for the use and storage of equipment and vessels.

With respect to the scope of the Estuarine Research Station, consideration should be given as to whether it will house staff that do flow and water quality monitoring. Will all the necessary equipment be stored there? Related to this question, will personnel from the U.S. Geological Survey be housed at this location? Will the complex require adjacent dredge and fill to accommodate large scale research vessels calling from other agencies? Will boat launches and ramps be required as well? Will the facility be compatible with a propagation component? The more specificity discussed in the EIS/EIR, the more scientific opportunities can be undertaken.

Finally, Metropolitan is interested in how the data will be managed and shared. Have discussions begun on the set up for data management access and dissemination? Metropolitan is interested in further understanding the data management infrastructure setup and approach (such as open source), costs (startup/maintenance), implementation of developed data, and the governance of the data systems that are developed and managed. This could have a significant cost associated as more and more datasets are added. Currently, Metropolitan is working on a collaborative effort on data management through Bay Delta Live (http://www.baydeltalive.com/). The purpose of this website is to aggregate the wealth of knowledge and information that is produced by the many governmental and non-governmental agencies, non-profits, universities and individuals and display this information in an easy to use web application. This initial effort to aggregate this important data will give all stakeholders visual insight into Delta and neighboring regions with respect to water quality, hydrodynamics, salinity and turbidity conditions, fish projects, infrastructure projects, etc. Adding data from the proposed project should be seamless to further collaboration and best science applications in solving Bay Delta issues.

We appreciate the opportunity to provide input to your planning process and we look forward to receiving future information concerning this project including the eventual draft Master Plan on the complex's design. If we can be of further assistance, or if you would like to discuss

Metropolitan's comments on the NOI or the proposed project, please contact me at sarakawa@mwdh2o.com or for data management considerations, Mr. Russ Ryan at rryan@mwdh2o.com.

Very truly yours,

Stephen M. Arakawa

Stephen Arakawa
Manager, Bay-Delta Initiatives

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STATE OF CALIFORNIA — Edmond G. Brown, Jr., *Governor*
NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

December 10, 2014

John Engstrom
California Department of Water Resources
1416 Ninth Street, Rm 315-3
Sacramento, CA 94236

RE: SCH# 2014122017 Delta Research Station, Solano and San Joaquin Counties.

Dear Mr. Engstrom,

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

- ✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for pubic disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. **USGS 7.5-minute quadrangle name, township, range, and section required**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) Guidelines §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered cultural items that are not burial associated, which are addressed in Public Resources Code (PRC) §5097.98, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, PRC §5097.98, and CEQA Guidelines §15064.5(e), address the process to be followed in the event of an accidental discovery of any human remains and associated grave goods in a location other than a dedicated cemetery.

Sincerely,

Gayle Totton

Gayle Totton
Associate Government Program Analyst

CC: State Clearinghouse

Native American Contacts
Solano and San Joaquin Counties
December 10, 2014

Yocha Dehe Wintun Nation
Marshall McKay, Chairperson
P.O. Box 18 — Wintun (Patwin)
Brooks , CA 95606
(530) 796-3400
(530) 796-2143 Fax

Randy Yonemura
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Sacramento , CA 95824
randy_yonemura@yahoo.
(916) 421-1600
(916) 601-4069 Cell

Wilton Rancheria
Raymond Hitchcock, Chairperson
9728 Kent Street — Miwok
Elk Grove , CA 95624
rhitchcock@wiltonrancheria-nsn.gov
(916) 683-6000 Office
(916) 683-6015 Fax

Cortina Band of Indians
Charlie Wright, Chairperson
P.O. Box 1630 — Wintun / Patwin
Williams , CA 95987
(530) 473-3274 Office
(530) 473-3301 Fax

Katherine Erolinda Perez
P.O. Box 717 — Ohlone/Costanoan
Linden , CA 95236 — Northern Valley Yokuts
canutes@verizon.net — Bay Miwok
(209) 887-3415

Buena Vista Rancheria
Rhonda Morningstar Pope, Chairperson
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rhonda@buenavistatribe.
(916) 491-0011 Office
(916) 491-0012 Fax

Ione Band of Miwok Indians
Yvonne Miller, Chairperson
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administrator@ionemiwok.
(209) 245-5800 Office
(209) 245-3112 Fax

California Valley Miwok Tribe
Silvia Burley
10601 N Escondido PL — Miwok
Stockton , CA 95212
office@cvmt.net
(209) 931-4567 Office
(209) 931-4333 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed Delta Research Station Project, Solano and San Joaquin Counties.

Native American Contacts
Solano and San Joaquin Counties
December 10, 2014

North Valley Yokuts Tribe
Katherine Erolinda Perez
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Linden , CA 95236 — Northern Valley Yokuts
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(925) 586-8919

Southern Sierra Miwuk Nation
Lois Martin, Chairperson
P.O. Box 186 — Miwok
Mariposa , CA 95338 — Pauite
(209) 742-6867 Office — Northern Valley Yokut

Yocha Dehe Wintun Nation
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lkinter@yochadehe-nsn.gov
(530) 979-6346
(530) 796-3400 - office
(530) 796-2143 Fax

Ione Band of Miwok Indians
Pamela Baumgartner, Tribal Administrator
P.O. Box 699 — Miwok
Plymouth , CA 95669
pam@ionemiwok.org
(209) 245-5800 Office
(209) 245-3112 Fax

Southern Sierra Miwuk Nation
Les James, Spiritual Leader
P.O. Box 1200 — Miwok
Mariposa , CA 95338 — Pauite
(209) 966-3690 — Northern Valley Yokut

Ione Band of Miwok Indians
Tina Reynolds, Executive Secretary
P.O. Box 699 — Miwok
Plymouth , CA 95669
tina@ionemiwok.org
(209) 245-5800 Office
(209) 245-3112 Fax

Ione Band of Miwok Indians Cultural Committee
Anthony Burris, Chairperson
P.O. Box 699 — Miwok
Plymouth , CA 95669
(209) 245-5800 Office
(209) 245-3112 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed Delta Research Station Project, Solano and San Joaquin Counties.

Native American Contacts
Solano and San Joaquin Counties
December 10, 2014

Yocha Dehe Wintun Nation
Cynthia Clarke, Native Cultural Renewal Committe
P.O. Box 18 Wintun (Patwin)
Brooks , CA 95606
(530) 796-3400 Office
(530) 796-2143 Fax

Wilton Rancheria
Steven Hutchason, Executive Director Environmental
9728 Kent Street Miwok
Elk Grove , CA 95624
shutchason@wiltonrancheria-nsn.gov
(916) 683-6000, Ext. 2006
(916) 683-6015 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting locative Americans with regard to cultural resources for the proposed Delta Research Station Project, Solano and San Joaquin Counties.

State of California
Native American Heritage
Commission
1550 Harbor Blvd., Ste 100
West Sacramento, CA 95691

SACRAMENTO
15 PM 4:22

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From:	Ken Schwarz
To:	MaryEllen Lamothe
Cc:	Megan Giglini; Michael Stevenson; Tom Engels
Subject:	RE: Comments on Delta Research Station (RioVista)
Date:	Tuesday, January 06, 2015 11:24:33 AM

Hi Mary Ellen,

Thank you very much for sending along these comments. I have forwarded it to Tom Engels who is the Horizon project manager looking after this process, and collecting/organizing all comments. We appreciate your commenting on the project,

Ken

Kenneth Schwarz, Ph.D.

Principal

Horizon Water and Environment

ken@horizonh20.com

(w) 510-986-1851

(m) 510-421-7664

From: MaryEllen Lamothe [mailto:maryellen2@frontiernet.net]
Sent: Tuesday, January 06, 2015 11:21 AM
To: megan@horizonh2o.com; ken@horizonh20.com
Subject: Fwd: Comments on Delta Research Station (RioVista)

Attached email is Draft EIR/EIS -Scoping Comment Form from a December meeting in Rio Vista. The email to John Engstrom was returned to me by Michael Stevenson, out-of-office through 1/18. I understand this needs to be received by Jan. 9th. Please pass this along to John Engstrom or correct recipient.

Thank You.

Begin forwarded message:

From: MaryEllen Lamothe <maryellen2@frontiernet.net>
Subject: Comments on Delta Research Station (RioVista)
Date: January 6, 2015 at 11:03:36 AM PST
Cc: Sue Conklin <sueriov@gmail.com>
To: scoping@deltaresearchstation.com

Attn: John Engstrom

Re: Rio Vista location

Locating the research station at the former Army Base is excellent use of this property and I eagerly await its completion. I don’t doubt that all of the impacts on this small community can and will be mitigated without great expense or effort.

Living nearby, between 2nd St. and the river, I would welcome the increased numbers of workers in our town, despite additional traffic. Environmental impacts are not always negative.

• Increased traffic and workers in the area mean better business for restaurants, markets, gas stations, etc. in town during construction phase and ongoing employment

- With the strong winds we have in this area, Increased pollutents in the air are quickly dispersed
- Traffic on Second St. — this street has always been a thoroughfare as it connects to the west side of the county. Increased traffic may be a nuisance, but a residence in this location was purchased knowing that this is one of the only routes through the city. Growth happens.
- Visual impacts:
  - -the prison-like rusted chain link fence surrounding the property will be replaced
  - -the derelict rotting buildings will be removed or restored
  - - this prime waterfront area will be repurposed to an attractive site
- Animals: I walk by this site daily, many rabbits, moles and critters. Every one of them will take up residence across the street on the hillside where sheep roam.
- Noise/Lights/smell: no impact here after construction is completed. The sewer plant down the road has a BIG impact on the area and should be red-tagged as being an environmental irritant.
- Housing/Lodging for workers: by the time this project is completed, there will be additional apartments for short and long term rental (RV Hotel, Hwy. 12 properties) In addition, there are three planned and approved housing projects within 4 miles of the site. Developers await changes in the market before proceeding.
- Traffic: By the time this projects gets moving, much of the Hwy. 12 improvements will be completed. Good news! Compared to other regional/urban traffic, a commute to Rio Vista would be a pleasure for most.

MaryEllen Lamothe
RioVista resident
50 Highland Dr.

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San Joaquin Valley
AIR POLLUTION CONTROL DISTRICT

HEALTHY AIR LIVING™

December 19, 2014

John Engstrom
California Department of Water Resources
1416 Ninth Street, Room 315-3
Sacramento, CA 94236-0001

Project: Notice of Preparation (NOP) of a Draft Environmental Impact Report/Environmental Impact Statement (DEIS/EIR) for the Delta Research Station

District CEQA Reference No: 20140946

Dear Mr. Engstrom:

The San Joaquin Valley Unified Air Pollution Control District (District) has reviewed the Notice of Preparation (NOP) for the proposed Delta Research Station (DRS). The proposed project consists of the construction and operation of a DRS in the San Francisco/Sacramento-San Joaquin Delta Estuary (Bay Delta), California. The proposed project would consists of the following two facilities: a Estuarine Research Station (ERS) and Fish Technology Center (FTC). The District offers the following comments:

Emissions Analysis

1) The District is currently designated as extreme nonattainment for the 8-hour ozone standard, attainment for PM10 and CO, and nonattainment for PM2.5 for the federal air quality standards. At the state level, the District is designated as nonattainment for the 8-hour ozone, PM10, and PM2.5 air quality standards. The District recommends that the Air Quality section of the Environmental Impact Report (EIR) include a discussion of the following impacts:

   a) **Criteria Pollutants:** Project related criteria pollutant emissions should be identified and quantified. The discussion should include existing and post-project emissions.

      i) Construction Emissions: Construction emissions are short-term emissions and should be evaluated separate from operational emissions. The District recommends preparation of an Environmental Impact Report (EIR) if annual construction emissions cannot be reduced or mitigated to below the following levels of significance: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns or less in size (PM10).

- *Recommended Mitigation:* To reduce impacts from construction related exhaust emissions, the District recommends feasible mitigation for the project to utilize off-road construction fleets that can achieve fleet average emissions equal to or cleaner than the Tier II emission standards, as set forth in §2423 of Title 13 of the California Code of Regulations, and Part 89 of Title 40 Code of Federal Regulations. This can be achieved through any combination of uncontrolled engines and engines complying with Tier II and above engine standards.

ii) Operational Emissions: Operational Emissions: Permitted (stationary sources) and non-permitted (mobile sources) sources should be analyzed separately. The District recommends preparation of an Environmental Impact Report (EIR) if the sum of annual permitted and the sum of the annual non-permitted emissions each cannot be reduced or mitigated to below the following levels of significance: 10 tons per year of oxides of nitrogen (NOx), 10 tons per year of reactive organic gases (ROG), or 15 tons per year particulate matter of 10 microns of less in size (PM10).

- *Recommended Mitigation:* Project related impacts on air quality can be reduced through incorporation of design elements, for example, that increase energy efficiency, reduce vehicle miles traveled, and reduce construction exhaust related emissions. However, design elements and compliance with District rules and regulations may not be sufficient to reduce project related impacts on air quality to a less than significant level.

- *Recommended Mitigation:* Another example of a feasible mitigation measure is the mitigation of project emissions through a Voluntary Emission Reduction Agreement (VERA). The VERA is an instrument by which the project proponent provides monies to the District, which is used by the District to fund emission reduction projects that achieve the reductions required by the lead agency. District staff is available to meet with project proponents to discuss a VERA for specific projects. For more information, or questions concerning this topic, please call District Staff at (559) 230-6000.

iii) Recommended Model: Project related criteria pollutant emissions should be identified and quantified. Emissions analysis should be performed using CalEEMod (**Cal**ifornia **E**mission **E**stimator **Mod**el), which uses the most recent approved version of relevant Air Resources Board (ARB) emissions models and emission factors. CalEEMod is available to the public and can be downloaded from the CalEEMod website at: www.caleemod.com.

b) **Nuisance Odors:** The project should be evaluated to determine the likelihood that the project would result in nuisance odors. Nuisance orders are subjective, thus the District has not established thresholds of significance for nuisance odors. Nuisance odors may be assessed qualitatively taking into consideration of project design elements and proximity to off-site receptors that potentially would be exposed objectionable odors.

c) **Health Impacts:** Project related health impacts should be evaluated to determine if emissions of toxic air contaminants (TAC) will pose a significant health risk to nearby sensitive receptors. TACs are defined as air pollutants that which may cause or contribute to an increase in mortality or serious illness, or which may pose a hazard to human health. The most common source of TACs can be attributed to diesel exhaust fumes that are emitted from both stationary and mobile sources. Health impacts may require a detailed health risk assessment (HRA).

Prior to conducting an HRA, an applicant may perform a prioritization on all sources of emissions to determine if it is necessary to conduct an HRA. A prioritization is a screening tool used to identify projects that may have significant health impacts. If the project has a prioritization score of 1.0 or more, the project has the potential to exceed the District's significance threshold for health impacts of 10 in a million and an HRA should be performed.

If an HRA is to be performed, it is recommended that the project proponent contact the District to review the proposed modeling approach. The project would be considered to have a significant health risk if the HRA demonstrates that project related health impacts would exceed the District's significance threshold of 10 in a million.

More information on TACs, prioritizations and HRAs can be obtained by:

- E-mailing inquiries to: hramodeler@valleyair.org; or
- Visiting the District's website at:

  http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm.

2) In addition to the discussions on potential impacts identified above, the District recommends the EIR also include the following discussions:

a) A discussion of the methodology, model assumptions, inputs and results used in characterizing the project's impact on air quality. To comply with CEQA requirements for full disclosure, the District recommends that the modeling outputs be provided as appendices to the EIR. The District further recommends that the District be provided with an electronic copy of all input and output files for all modeling.

b) A discussion of the components and phases of the project and the associated emission projections, including ongoing emissions from each previous phase.

c) A discussion of project design elements and mitigation measures, including characterization of the effectiveness of each mitigation measure incorporated into the project.

d) A discussion of whether the project would result in a cumulatively considerable net increase of any criteria pollutant or precursor for which the San Joaquin Valley Air Basin is in non-attainment. More information on the District's attainment status can be found online by visiting the District's website at:

http://valleyair.org/aqinfo/attainment.htm.

District Rules and Regulations

3) The proposed project may be subject to District rules and regulations, including: Regulation VIII (Fugitive PM10 Prohibitions), Rule 4102 (Nuisance), and Rule 4641 (Cutback, Slow Cure, and Emulsified Asphalt, Paving and Maintenance Operations). In the event an existing building will be renovated, partially demolished or removed, the project may be subject to District Rule 4002 (National Emission Standards for Hazardous Air Pollutants).

4) Based on information provided, the proposed project may be subject to District Rule 9510.

   Any applicant subject to District Rule 9510 is required to submit an Air Impact Assessment (AIA) application to the District no later than applying for final discretionary approval, and to pay any applicable off-site mitigation fees before issuance of the first building permit. If approval of the subject project constitutes the last discretionary approval by your agency, the District recommends that demonstration of compliance with District Rule 9510, including payment of all applicable fees before issuance of the first building permit, be made a condition of project approval. Information about how to comply with District Rule 9510 can be found online at:

   http://www.valleyair.org/ISR/ISRHome.htm.

5) The above list of rules is neither exhaustive nor exclusive. To identify other District rules or regulations that apply to this project or to obtain information about District permit requirements, the applicant is strongly encouraged to contact the District's Small Business Assistance (SBA) Office at (209) 557-6446. Current District rules can be found online at the District's website at:

   www.valleyair.org/rules/1ruleslist.htm.

The District recommends that a copy of the District's comments be provided to the project proponent. If you have any questions or require further information, please call Mark Montelongo at (559) 230-5905.

Sincerely,

Arnaud Marjollet
Director of Permit Services

Mark Montelongo

for: Chay Thao
Program Manager

AM: mm

an Joaquin Valley
POLLUTION CONTROL DISTRICT

lain Office)
resno and Kings counties
g Avenue, Fresno, CA 93726-0244

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CA 936
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12/15/14 Rio Vista Scoping Meeting – Speaker Cards

Delta Research Station EIR/EIS Scoping
Speaker Card

Name: Al Medvitz **Date:**

Comment(s):

Delta Research Station EIR/EIS Scoping
Speaker Card

Name:

Date:

Comment(s):

Will GREEN ENERGY / ALTERNATIVE ENERGY Be a Key / factor (ie: WIND TURBINES, ~~SA~~ SOLAR, and So on.

Delta Research Station EIR/EIS Scoping
Speaker Card

Name: Bill Mortimore

Date: 12-15-14

Comment(s):

Is there an "Educational Component" for the project

Recreation but no Education

Delta Research Station EIR/EIS Scoping
Speaker Card

Name: Steve Haynes
Date:
Comment(s):

Delta Research Station EIR/EIS Scoping
Speaker Card

Name: Marci Coglianese
Date: 12/15/17
Comment(s):

Constraints

Appendix D
AIR QUALITY EMISSIONS

This appendix contains the CalEEMod emission calculations used for the air quality and greenhouse gas emissions analysis.

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Alternative	Construction Type	Worker Trips	Vendor Trips	Hauling Trips	Year	Emissions								
						ROG	Nox	CO	SO2	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5	CO2e
		Max Daily Trips		Total Trips		tons								MT
Alternative 2	Land Based	130	55	15,466	2016	0.7864	6.7936	6.5136	0.0122	0.4596	0.3081	0.1629	0.2877	1,092
					2017	2.5997	0.5259	0.4817	7.90E-04	0.0163	0.0308	4.42E-03	0.0288	69
	Marina	10	0	1,885		0.1912	2.2429	1.2922	2.86E-03	0.0371	0.0874	0.014	0.0809	267
	Total					3.5773	9.5624	8.2875	0.01585	0.513	0.4263	0.18132	0.3974	1,427
Alternative 3	Land Based	126	53	14,528	2016	0.77	6.6527	6.3353	0.0118	0.44	0.3059	0.1594	0.2857	1,054
					2017	2.5118	0.5241	0.477	7.80E-04	0.0158	0.0308	4.28E-03	0.0288	68
	Marina	10	0	9,915		0.4495	5.1948	3.8195	7.46E-03	0.5086	0.1841	0.2233	0.1699	692
	Total					3.73	***12.37***	10.63	0.02	0.96	0.52	0.39	0.48	1,814
Alternative 4	Land Based	131	55	5,534	2016	0.6639	5.5091	5.1317	8.54E-03	0.3578	0.2896	0.1379	0.2708	757
					2017	1.5877	0.5289	0.4832	7.90E-04	0.0166	0.0309	4.49E-03	2.89E-02	69
	Marina	10	0	11,450		0.453	5.232	3.9939	7.73E-03	0.5174	0.1844	0.253	0.1701	716
	Total					2.7046	***11.27***	9.6088	0.01706	0.8918	0.5049	0.39539	0.4698	1,541

CEQA Threshold (tons per year unless otherwise noted)								
SJVAPCD	10	10	100	27	15		15	
YSAQMD	10	10	not exceed AAQS		80 lb/day			

		Emissions								
		ROG	Nox	CO	SO2	Fugitive PM10	Exhaust PM10	Fugitive PM2.5	Exhaust PM2.5	CO2e
Alternative	**Source Type**	tons/year								MT/Year
	Area	1.33	0.00	0.00			0.00		0.00	0
	Energy	0.02	0.14	0.12	8.60E-04		0.01		0.01	527
	Energy-pumps									0
	Mobile-vehicles	0.55	1.51	5.83	8.89E-03	0.59	0.02	0.16	0.02	749
	Mobile-boats	9.27	46.56	44.74	5.44E-02		1.79		1.79	1,812
	Offroad	0.03	0.28	0.17	2.00E-04		0.02		0.02	19
	Waste									48
	Water									220
Alternative 1 (Future)	**Total**	11.19	48.49	50.86	6.43E-02	0.59	1.85	0.16	1.85	3,376
	Area	1.33	0.00	0.00			0.00		0.00	0
	Energy	0.02	0.14	0.12	8.60E-04		0.01		0.01	527
	Energy-pumps									0
	Mobile-vehicles	0.48	1.32	5.12	7.82E-03	0.52	0.02	0.14	0.02	659
	Mobile-boats	9.27	46.56	44.74	5.44E-02		1.79		1.79	1,812
	Offroad	0.03	0.28	0.17	2.00E-04		0.02		0.02	19
	Waste									48
	Water									220
Alternative 1 (Existing)	**Total**	11.12	48.31	50.16	6.33E-02	0.52	1.85	0.14	1.85	3,285
	Area	1.56	0.00	0.00			0.00		0.00	0
	Energy	0.02	0.20	0.17	1.18E-03		0.02		0.02	703
	Energy-pumps									716
	Mobile-vehicles	0.49	1.32	5.19	9.92E-03	0.64	0.02	0.02	0.02	770
	Mobile-boats	9.27	46.56	44.74	5.44E-02		1.79		1.79	1,812
	Offroad	0.03	0.24	0.16	2.00E-04		0.02		0.02	19
	Waste									54
	Water									218
	Total	11.37	48.32	50.26	6.57E-02	0.64	1.85	0.02	1.84	4,292
	Net (Future)	0.17	-0.17	-0.60	0.00	0.05	0.00	-0.14	0.00	916
Alternative 2	**Net (Existing)**	0.24	0.01	0.11	0.00	0.12	0.00	-0.12	0.00	1,007
	Area	1.51	0.00	0.00	0.00E+00		0.00		0.00	0
	Energy	0.02	0.19	0.16	1.12E-03		0.01		0.01	672
	Energy-pumps									716
	Mobile-vehicles	0.49	1.32	5.19	9.92E-03	0.64	0.02	0.17	0.02	770
	Mobile-boats	9.27	46.56	44.74	5.44E-02		1.79		1.79	1,812
	Offroad	0.03	0.24	0.16	2.00E-04		0.02		0.02	19
	Waste									50
	Water									213
	Total	11.32	48.31	50.26	6.56E-02	0.64	1.85	0.17	1.84	4,252
	Net (Future)	0.13	-0.18	-0.61	0.00	0.05	-0.01	0.01	0.00	876
Alternative 3	**Net (Existing)**	0.20	0.00	0.10	0.00	0.12	0.00	0.03	0.00	967
	Area	1.47	0.00	0.00	0.00E+00		0.00		0.00	0
	Energy	0.02	0.16	0.13	9.40E-04		0.01		0.01	689
	Energy-pumps									716
	Mobile-vehicles	0.58	1.98	6.63	1.16E-02	0.65	0.03	0.18	0.02	926
	Mobile-boats	9.27	46.56	44.74	5.44E-02		1.79		1.79	1,812
	Offroad	0.03	0.24	0.16	2.00E-04		0.02		0.02	19
	Waste									54
	Water									218
	Total	11.37	48.93	51.67	6.71E-02	0.65	1.85	0.18	1.85	4,435
	Net (Future)	0.18	0.44	0.81	0.00	0.06	0.00	0.02	0.00	1,059
Alternative 4	**Net (Existing)**	0.24	0.62	1.51	0.00	0.14	0.00	0.04	0.00	1,149

Vessel Engine Type	hp	LF	Annual hours	Number of Vessels	Zero Hour						Deterioration						Emissions (tons/year)						
					ROG	Nox	CO	Exhaust PM10	CO2e	fuel	ROG	Nox	CO	Exhaust PM10	CO2e	fuel	ROG	Nox	CO	SO2	Exhaust PM10	CO2e	fuel
Main Engine Vessels	400	0.45	675	48	0.68	3.99	3.73	0.15	587.47	184.16	0.44	0.21	0.25	0.44	0	0	6.295	31.037	29.974	0.036	1.111	3,777	1,184
Auxiliary Engine Vessels	200	0.43	750	48	0.68	3.99	3.73	0.15	587.47	184.16	0.28	0.14	0.16	0.67	0	0	2.970	15.523	14.766	0.019	0.684	2,005	628
Total																	9.265	46.560	44.740	0.054	1.795	5,782	1,812

Notes:

1. The emissions are based on work boat vessels from CARB's California Commercial harbor Craft Emissions Estimation. It was assumed the vessels would be work boats.
2. The annual hours used the default from the emissions model since total hours of the 48 vessels was not available.
3. It was conservatively assumed that vessels had the maximum deterioration possible.

	kW	Hours	kwH/year	CO2	Ch4	N2O	CO2e
				lb/MWh			MT
Circulation pumps	168	8760	1471680	641.35	0.029	0.006	429.7764
Well Pumps	112	8760	981120	641.35	0.029	0.006	286.5176
			GWP	1	21	310	

maintenance dredging

Statewide , Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 54

Climate Zone 4 **Operational Year** 2014

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined

Construction Phase - Assume 10 days of dredging activities every 10-15 years.

Off-road Equipment - Assume Dozer, generator, and tug/barge (400hp) for dredging equipment.

Grading -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	10.00
tblGrading	MaterialExported	0.00	11,000.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.0287	0.3369	0.2723	6.6000e-004	0.0427	0.0100	0.0528	0.0199	9.3700e-003	0.0293	0.0000	60.0373	60.0373	3.7800e-003	0.0000	60.1166
Total	**0.0287**	**0.3369**	**0.2723**	**6.6000e-004**	**0.0427**	**0.0100**	**0.0528**	**0.0199**	**9.3700e-003**	**0.0293**	**0.0000**	**60.0373**	**60.0373**	**3.7800e-003**	**0.0000**	**60.1166**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.0287	0.3369	0.2723	6.6000e-004	0.0427	0.0100	0.0528	0.0199	9.3700e-003	0.0293	0.0000	60.0373	60.0373	3.7800e-003	0.0000	60.1166
Total	**0.0287**	**0.3369**	**0.2723**	**6.6000e-004**	**0.0427**	**0.0100**	**0.0528**	**0.0199**	**9.3700e-003**	**0.0293**	**0.0000**	**60.0373**	**60.0373**	**3.7800e-003**	**0.0000**	**60.1166**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/14/2016	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Generator Sets	1	8.00	84	0.74
Site Preparation	Other Material Handling Equipment	1	8.00	400	0.40
Site Preparation	Graders	0	8.00	174	0.41
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

<u>Trips and VMT</u>

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	1,375.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0307	0.0000	0.0307	0.0167	0.0000	0.0167	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0138	0.1492	0.0969	1.4000e-004		7.0500e-003	7.0500e-003		6.6300e-003	6.6300e-003	0.0000	13.3442	13.3442	3.4300e-003	0.0000	13.4162
Total	**0.0138**	**0.1492**	**0.0969**	**1.4000e-004**	**0.0307**	**7.0500e-003**	**0.0378**	**0.0167**	**6.6300e-003**	**0.0233**	**0.0000**	**13.3442**	**13.3442**	**3.4300e-003**	**0.0000**	**13.4162**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0147	0.1875	0.1735	5.1000e-004	0.0117	2.9800e-003	0.0147	3.2100e-003	2.7400e-003	5.9500e-003	0.0000	46.3991	46.3991	3.3000e-004	0.0000	46.4060
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	2.0000e-004	1.9600e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2941	0.2941	2.0000e-005	0.0000	0.2944
Total	**0.0149**	**0.1877**	**0.1754**	**5.1000e-004**	**0.0120**	**2.9800e-003**	**0.0150**	**3.2900e-003**	**2.7400e-003**	**6.0400e-003**	**0.0000**	**46.6932**	**46.6932**	**3.5000e-004**	**0.0000**	**46.7004**

3.2 Site Preparation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0307	0.0000	0.0307	0.0167	0.0000	0.0167	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0138	0.1492	0.0969	1.4000e-004		7.0500e-003	7.0500e-003		6.6300e-003	6.6300e-003	0.0000	13.3442	13.3442	3.4300e-003	0.0000	13.4162
Total	**0.0138**	**0.1492**	**0.0969**	**1.4000e-004**	**0.0307**	**7.0500e-003**	**0.0378**	**0.0167**	**6.6300e-003**	**0.0233**	**0.0000**	**13.3442**	**13.3442**	**3.4300e-003**	**0.0000**	**13.4162**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0147	0.1875	0.1735	5.1000e-004	0.0117	2.9800e-003	0.0147	3.2100e-003	2.7400e-003	5.9500e-003	0.0000	46.3991	46.3991	3.3000e-004	0.0000	46.4060
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.5000e-004	2.0000e-004	1.9600e-003	0.0000	3.2000e-004	0.0000	3.2000e-004	8.0000e-005	0.0000	9.0000e-005	0.0000	0.2941	0.2941	2.0000e-005	0.0000	0.2944
Total	**0.0149**	**0.1877**	**0.1754**	**5.1000e-004**	**0.0120**	**2.9800e-003**	**0.0150**	**3.2900e-003**	**2.7400e-003**	**6.0400e-003**	**0.0000**	**46.6932**	**46.6932**	**3.5000e-004**	**0.0000**	**46.7004**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.494080	0.063211	0.178687	0.145921	0.045614	0.006804	0.014884	0.037486	0.001879	0.002258	0.005933	0.000705	0.002538

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

maintenance dredging

Statewide , Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 54

Climate Zone 4 **Operational Year** 2014

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined

Construction Phase - Assume 10 days of dredging activities every 10-15 years.

Off-road Equipment - Assume Dozer, generator, and tug/barge (400hp) for dredging equipment.

Grading -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	10.00
tblGrading	MaterialExported	0.00	11,000.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.5194	65.6209	49.1213	0.1314	8.6133	2.0067	10.6201	4.0044	1.8731	5.8775	0.0000	13,250.3371	13,250.3371	0.8323	0.0000	13,267.8146
Total	**5.5194**	**65.6209**	**49.1213**	**0.1314**	**8.6133**	**2.0067**	**10.6201**	**4.0044**	**1.8731**	**5.8775**	**0.0000**	**13,250.3371**	**13,250.3371**	**0.8323**	**0.0000**	**13,267.8146**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.5194	65.6209	49.1213	0.1314	8.6133	2.0067	10.6201	4.0044	1.8731	5.8775	0.0000	13,250.3371	13,250.3371	0.8323	0.0000	13,267.8146
Total	**5.5194**	**65.6209**	**49.1213**	**0.1314**	**8.6133**	**2.0067**	**10.6201**	**4.0044**	**1.8731**	**5.8775**	**0.0000**	**13,250.3371**	**13,250.3371**	**0.8323**	**0.0000**	**13,267.8146**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.1000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2016	1/14/2016	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Rubber Tired Dozers	1	8.00	255	0.40
Site Preparation	Generator Sets	1	8.00	84	0.74
Site Preparation	Other Material Handling Equipment	1	8.00	400	0.40
Site Preparation	Graders	0	8.00	174	0.41
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	3	8.00	0.00	1,375.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1465	0.0000	6.1465	3.3291	0.0000	3.3291			0.0000			0.0000
Off-Road	2.7627	29.8459	19.3820	0.0289		1.4108	1.4108		1.3251	1.3251		2,941.8849	2,941.8849	0.7565		2,957.7705
Total	**2.7627**	**29.8459**	**19.3820**	**0.0289**	**6.1465**	**1.4108**	**7.5573**	**3.3291**	**1.3251**	**4.6541**		**2,941.8849**	**2,941.8849**	**0.7565**		**2,957.7705**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.7242	35.7397	29.3207	0.1016	2.4011	0.5954	2.9965	0.6579	0.5475	1.2055		10,239.4431	10,239.4431	0.0722		10,240.9584
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0325	0.0353	0.4187	8.3000e-004	0.0657	5.4000e-004	0.0663	0.0174	4.9000e-004	0.0179		69.0091	69.0091	3.6500e-003		69.0858
Total	**2.7567**	**35.7750**	**29.7393**	**0.1025**	**2.4668**	**0.5959**	**3.0627**	**0.6754**	**0.5480**	**1.2234**		**10,308.4522**	**10,308.4522**	**0.0758**		**10,310.0441**

3.2 Site Preparation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1465	0.0000	6.1465	3.3291	0.0000	3.3291			0.0000			0.0000
Off-Road	2.7627	29.8459	19.3820	0.0289		1.4108	1.4108		1.3251	1.3251	0.0000	2,941.884 9	2,941.884 9	0.7565		2,957.770 5
Total	**2.7627**	**29.8459**	**19.3820**	**0.0289**	**6.1465**	**1.4108**	**7.5573**	**3.3291**	**1.3251**	**4.6541**	**0.0000**	**2,941.884 9**	**2,941.884 9**	**0.7565**		**2,957.770 5**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.7242	35.7397	29.3207	0.1016	2.4011	0.5954	2.9965	0.6579	0.5475	1.2055		10,239.44 31	10,239.44 31	0.0722		10,240.95 84
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0325	0.0353	0.4187	8.3000e-004	0.0657	5.4000e-004	0.0663	0.0174	4.9000e-004	0.0179		69.0091	69.0091	3.6500e-003		69.0858
Total	**2.7567**	**35.7750**	**29.7393**	**0.1025**	**2.4668**	**0.5959**	**3.0627**	**0.6754**	**0.5480**	**1.2234**		**10,308.45 22**	**10,308.45 22**	**0.0758**		**10,310.04 41**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.494080	0.063211	0.178687	0.145921	0.045614	0.006804	0.014884	0.037486	0.001879	0.002258	0.005933	0.000705	0.002538

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

<u>Unmitigated</u>

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.1000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.1000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Delta Research Station Alt 1 145 workers existing

Statewide , Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	66.50	1000sqft	1.53	66,500.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	308.00	Space	2.77	123,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	4			**Operational Year**	2014
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - no construction

Off-road Equipment -

Grading -

Vehicle Trips - Assigned ratio of trips to R&D based on number of workers 145, Monday through Saturday.

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Energy Use -

Operational Off-Road Equipment - Assumed a forklift.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	0.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	9.65
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	8.11	9.65
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.3316	4.0000e-005	4.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4900e-003	8.4900e-003	3.0000e-005	0.0000	9.0200e-003
Energy	0.0158	0.1439	0.1209	8.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	524.5113	524.5113	0.0196	6.3100e-003	526.8808
Mobile	0.4795	1.3239	5.1245	7.8200e-003	0.5159	0.0194	0.5353	0.1383	0.0178	0.1561	0.0000	657.8909	657.8909	0.0317	0.0000	658.5575
Offroad	0.0324	0.2795	0.1665	2.0000e-004		0.0234	0.0234		0.0215	0.0215	0.0000	19.1067	19.1067	5.6500e-003	0.0000	19.2252
Waste						0.0000	0.0000		0.0000	0.0000	21.5719	0.0000	21.5719	1.2749	0.0000	48.3439
Water						0.0000	0.0000		0.0000	0.0000	17.7466	149.9728	167.7194	1.8295	0.0444	219.9166
Total	**1.8594**	**1.7474**	**5.4165**	**8.8800e-003**	**0.5159**	**0.0538**	**0.5697**	**0.1383**	**0.0503**	**0.1886**	**39.3185**	**1,351.4901**	**1,390.8086**	**3.1614**	**0.0508**	**1,472.9331**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.3316	4.0000e-005	4.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4900e-003	8.4900e-003	3.0000e-005	0.0000	9.0200e-003
Energy	0.0158	0.1439	0.1209	8.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	524.5113	524.5113	0.0196	6.3100e-003	526.8808
Mobile	0.4795	1.3239	5.1245	7.8200e-003	0.5159	0.0194	0.5353	0.1383	0.0178	0.1561	0.0000	657.8909	657.8909	0.0317	0.0000	658.5575
Offroad	0.0324	0.2795	0.1665	2.0000e-004		0.0234	0.0234		0.0215	0.0215	0.0000	19.1067	19.1067	5.6500e-003	0.0000	19.2252
Waste						0.0000	0.0000		0.0000	0.0000	21.5719	0.0000	21.5719	1.2749	0.0000	48.3439
Water						0.0000	0.0000		0.0000	0.0000	17.7466	149.9728	167.7194	1.8292	0.0444	219.8883
Total	**1.8594**	**1.7474**	**5.4165**	**8.8800e-003**	**0.5159**	**0.0538**	**0.5697**	**0.1383**	**0.0503**	**0.1886**	**39.3185**	**1,351.4901**	**1,390.8086**	**3.1611**	**0.0507**	**1,472.9048**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.74**	**15.99**	**3.07**	**2.25**	**0.00**	**43.54**	**4.11**	**0.00**	**42.81**	**11.42**	**0.00**	**1.41**	**1.37**	**0.19**	**0.14**	**1.31**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	12/31/2015	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4795	1.3239	5.1245	7.8200e-003	0.5159	0.0194	0.5353	0.1383	0.0178	0.1561	0.0000	657.8909	657.8909	0.0317	0.0000	658.5575
Unmitigated	0.4795	1.3239	5.1245	7.8200e-003	0.5159	0.0194	0.5353	0.1383	0.0178	0.1561	0.0000	657.8909	657.8909	0.0317	0.0000	658.5575

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	641.73	641.73	0.00	1,378,561	1,378,561
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	641.73	641.73	0.00	1,378,561	1,378,561

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.494080	0.063211	0.178687	0.145921	0.045614	0.006804	0.014884	0.037486	0.001879	0.002258	0.005933	0.000705	0.002538

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
NaturalGas Mitigated	0.0158	0.1439	0.1209	8.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	156.6927	156.6927	3.0000e-003	2.8700e-003	157.6463
NaturalGas Unmitigated	0.0158	0.1439	0.1209	8.6000e-004		0.0109	0.0109		0.0109	0.0109	0.0000	156.6927	156.6927	3.0000e-003	2.8700e-003	157.6463
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	367.8186	367.8186	0.0166	3.4400e-003	369.2346
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	367.8186	367.8186	0.0166	3.4400e-003	369.2346

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	658125	3.5500e-003	0.0323	0.0271	1.9000e-004		2.4500e-003	2.4500e-003		2.4500e-003	2.4500e-003	0.0000	35.1201	35.1201	6.7000e-004	6.4000e-004	35.3338
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.94513e+006	0.0105	0.0954	0.0801	5.7000e-004		7.2500e-003	7.2500e-003		7.2500e-003	7.2500e-003	0.0000	103.7993	103.7993	1.9900e-003	1.9000e-003	104.4310
Unrefrigerated Warehouse-No Rail	256200	1.3800e-003	0.0126	0.0106	8.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	13.6718	13.6718	2.6000e-004	2.5000e-004	13.7550
Unrefrigerated Warehouse-No Rail	76860	4.1000e-004	3.7700e-003	3.1600e-003	2.0000e-005		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	4.1015	4.1015	8.0000e-005	8.0000e-005	4.1265
Total		**0.0158**	**0.1439**	**0.1209**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**156.6927**	**156.6927**	**3.0000e-003**	**2.8700e-003**	**157.6463**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	658125	3.5500e-003	0.0323	0.0271	1.9000e-004		2.4500e-003	2.4500e-003		2.4500e-003	2.4500e-003	0.0000	35.1201	35.1201	6.7000e-004	6.4000e-004	35.3338
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.94513e+006	0.0105	0.0954	0.0801	5.7000e-004		7.2500e-003	7.2500e-003		7.2500e-003	7.2500e-003	0.0000	103.7993	103.7993	1.9900e-003	1.9000e-003	104.4310
Unrefrigerated Warehouse-No Rail	256200	1.3800e-003	0.0126	0.0106	8.0000e-005		9.5000e-004	9.5000e-004		9.5000e-004	9.5000e-004	0.0000	13.6718	13.6718	2.6000e-004	2.5000e-004	13.7550
Unrefrigerated Warehouse-No Rail	76860	4.1000e-004	3.7700e-003	3.1600e-003	2.0000e-005		2.9000e-004	2.9000e-004		2.9000e-004	2.9000e-004	0.0000	4.1015	4.1015	8.0000e-005	8.0000e-005	4.1265
Total		**0.0158**	**0.1439**	**0.1209**	**8.6000e-004**		**0.0109**	**0.0109**		**0.0109**	**0.0109**	**0.0000**	**156.6927**	**156.6927**	**3.0000e-003**	**2.8700e-003**	**157.6463**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	212175	61.7241	2.7900e-003	5.8000e-004	61.9618
Parking Lot	108416	31.5395	1.4300e-003	3.0000e-004	31.6609
Research & Development	627095	182.4291	8.2500e-003	1.7100e-003	183.1314
Unrefrigerated Warehouse-No Rail	243600	70.8660	3.2000e-003	6.6000e-004	71.1389
Unrefrigerated Warehouse-No Rail	73080	21.2598	9.6000e-004	2.0000e-004	21.3417
Total		**367.8186**	**0.0166**	**3.4500e-003**	**369.2346**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Light Industry	212175	61.7241	2.7900e-003	5.8000e-004	61.9618
Parking Lot	108416	31.5395	1.4300e-003	3.0000e-004	31.6609
Research & Development	627095	182.4291	8.2500e-003	1.7100e-003	183.1314
Unrefrigerated Warehouse-No Rail	243600	70.8660	3.2000e-003	6.6000e-004	71.1389
Unrefrigerated Warehouse-No Rail	73080	21.2598	9.6000e-004	2.0000e-004	21.3417
Total		**367.8186**	**0.0166**	**3.4500e-003**	**369.2346**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.3316	4.0000e-005	4.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4900e-003	8.4900e-003	3.0000e-005	0.0000	9.0200e-003
Unmitigated	1.3316	4.0000e-005	4.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4900e-003	8.4900e-003	3.0000e-005	0.0000	9.0200e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1978					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.1334					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.6000e-004	4.0000e-005	4.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4900e-003	8.4900e-003	3.0000e-005	0.0000	9.0200e-003
Total	**1.3316**	**4.0000e-005**	**4.5600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**8.4900e-003**	**8.4900e-003**	**3.0000e-005**	**0.0000**	**9.0200e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1978					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.1334					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.6000e-004	4.0000e-005	4.5600e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.4900e-003	8.4900e-003	3.0000e-005	0.0000	9.0200e-003
Total	**1.3316**	**4.0000e-005**	**4.5600e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**8.4900e-003**	**8.4900e-003**	**3.0000e-005**	**0.0000**	**9.0200e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Unmitigated	167.7194	1.8295	0.0444	219.9166
Mitigated	167.7194	1.8292	0.0444	219.8883

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	5.20313 / 0	15.6005	0.1702	4.1300e-003	20.4557
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	32.6976 / 0	98.0372	1.0694	0.0260	128.5480
Unrefrigerated Warehouse-No Rail	18.0375 / 0	54.0817	0.5899	0.0143	70.9129
Total		**167.7194**	**1.8295**	**0.0444**	**219.9166**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Light Industry	5.20313 / 0	15.6005	0.1701	4.1300e-003	20.4530
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	32.6976 / 0	98.0372	1.0692	0.0259	128.5315
Unrefrigerated Warehouse-No Rail	18.0375 / 0	54.0817	0.5898	0.0143	70.9038
Total		**167.7194**	**1.8292**	**0.0444**	**219.8883**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	21.5719	1.2749	0.0000	48.3439
Unmitigated	21.5719	1.2749	0.0000	48.3439

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	27.9	5.6635	0.3347	0.0000	12.6922
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	5.05	1.0251	0.0606	0.0000	2.2973
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**21.5719**	**1.2749**	**0.0000**	**48.3439**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Light Industry	27.9	5.6635	0.3347	0.0000	12.6922
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	5.05	1.0251	0.0606	0.0000	2.2973
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**21.5719**	**1.2749**	**0.0000**	**48.3439**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0324	0.2795	0.1665	2.0000e-004		0.0234	0.0234		0.0215	0.0215	0.0000	19.1067	19.1067	5.6500e-003	0.0000	19.2252
Total	**0.0324**	**0.2795**	**0.1665**	**2.0000e-004**		**0.0234**	**0.0234**		**0.0215**	**0.0215**	**0.0000**	**19.1067**	**19.1067**	**5.6500e-003**	**0.0000**	**19.2252**

10.0 Vegetation

Delta Research Station Alt 1 145 workers existing

Statewide , Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	66.50	1000sqft	1.53	66,500.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	308.00	Space	2.77	123,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	4			**Operational Year**	2014
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - no construction

Off-road Equipment -

Grading -

Vehicle Trips - Assigned ratio of trips to R&D based on number of workers 145, Monday through Saturday.

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Energy Use -

Operational Off-Road Equipment - Assumed a forklift.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	0.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	9.65
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	8.11	9.65
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Energy	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934
Mobile	3.1329	7.9597	32.4618	0.0526	3.4151	0.1241	3.5391	0.9128	0.1139	1.0267		4,873.3518	4,873.3518	0.2245		4,878.0655
Offroad	0.2494	2.1500	1.2807	1.5200e-003		0.1801	0.1801		0.1657	0.1657		162.0115	162.0115	0.0479		163.0169
Total	**10.7682**	**10.8988**	**34.4557**	**0.0588**	**3.4151**	**0.3643**	**3.7794**	**0.9128**	**0.3397**	**1.2525**		**5,981.9007**	**5,981.9007**	**0.2908**	**0.0174**	**5,993.3862**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Energy	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934
Mobile	3.1329	7.9597	32.4618	0.0526	3.4151	0.1241	3.5391	0.9128	0.1139	1.0267		4,873.3518	4,873.3518	0.2245		4,878.0655
Offroad	0.2494	2.1500	1.2807	1.5200e-003		0.1801	0.1801		0.1657	0.1657		162.0115	162.0115	0.0479		163.0169
Total	**10.7682**	**10.8988**	**34.4557**	**0.0588**	**3.4151**	**0.3643**	**3.7794**	**0.9128**	**0.3397**	**1.2525**		**5,981.9007**	**5,981.9007**	**0.2908**	**0.0174**	**5,993.3862**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**2.32**	**19.73**	**3.72**	**2.58**	**0.00**	**49.44**	**4.77**	**0.00**	**48.78**	**13.23**	**0.00**	**2.71**	**2.71**	**16.47**	**0.00**	**2.72**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	12/31/2015	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Mitigated	3.1329	7.9597	32.4618	0.0526	3.4151	0.1241	3.5391	0.9128	0.1139	1.0267		4,873.3518	4,873.3518	0.2245		4,878.0655
Unmitigated	3.1329	7.9597	32.4618	0.0526	3.4151	0.1241	3.5391	0.9128	0.1139	1.0267		4,873.3518	4,873.3518	0.2245		4,878.0655

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	641.73	641.73	0.00	1,378,561	1,378,561
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	641.73	641.73	0.00	1,378,561	1,378,561

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.494080	0.063211	0.178687	0.145921	0.045614	0.006804	0.014884	0.037486	0.001879	0.002258	0.005933	0.000705	0.002538

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934
NaturalGas Unmitigated	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1803.08	0.0195	0.1768	0.1485	1.0600e-003		0.0134	0.0134		0.0134	0.0134		212.1273	212.1273	4.0700e-003	3.8900e-003	213.4183
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	5329.11	0.0575	0.5225	0.4389	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.9541	626.9541	0.0120	0.0115	630.7696
Unrefrigerated Warehouse-No Rail	210.575	2.2700e-003	0.0206	0.0173	1.2000e-004		1.5700e-003	1.5700e-003		1.5700e-003	1.5700e-003		24.7736	24.7736	4.7000e-004	4.5000e-004	24.9243
Unrefrigerated Warehouse-No Rail	701.918	7.5700e-003	0.0688	0.0578	4.1000e-004		5.2300e-003	5.2300e-003		5.2300e-003	5.2300e-003		82.5786	82.5786	1.5800e-003	1.5100e-003	83.0811
Total		**0.0868**	**0.7887**	**0.6625**	**4.7200e-003**		**0.0599**	**0.0599**		**0.0599**	**0.0599**		**946.4335**	**946.4335**	**0.0181**	**0.0173**	**952.1934**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.80308	0.0195	0.1768	0.1485	1.0600e-003		0.0134	0.0134		0.0134	0.0134		212.1273	212.1273	4.0700e-003	3.8900e-003	213.4183
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	5.32911	0.0575	0.5225	0.4389	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.9541	626.9541	0.0120	0.0115	630.7696
Unrefrigerated Warehouse-No Rail	0.210575	2.2700e-003	0.0206	0.0173	1.2000e-004		1.5700e-003	1.5700e-003		1.5700e-003	1.5700e-003		24.7736	24.7736	4.7000e-004	4.5000e-004	24.9243
Unrefrigerated Warehouse-No Rail	0.701918	7.5700e-003	0.0688	0.0578	4.1000e-004		5.2300e-003	5.2300e-003		5.2300e-003	5.2300e-003		82.5786	82.5786	1.5800e-003	1.5100e-003	83.0811
Total		**0.0868**	**0.7887**	**0.6625**	**4.7200e-003**		**0.0599**	**0.0599**		**0.0599**	**0.0599**		**946.4335**	**946.4335**	**0.0181**	**0.0173**	**952.1934**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Unmitigated	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0838					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.2103					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.1200e-003	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Total	**7.2992**	**4.9000e-004**	**0.0507**	**0.0000**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**		**0.1040**	**0.1040**	**3.1000e-004**		**0.1105**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0838					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.2103					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.1200e-003	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Total	**7.2992**	**4.9000e-004**	**0.0507**	**0.0000**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**		**0.1040**	**0.1040**	**3.1000e-004**		**0.1105**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.2494	2.1500	1.2807	1.5200e-003		0.1801	0.1801		0.1657	0.1657		162.0115	162.0115	0.0479		163.0169
Total	**0.2494**	**2.1500**	**1.2807**	**1.5200e-003**		**0.1801**	**0.1801**		**0.1657**	**0.1657**		**162.0115**	**162.0115**	**0.0479**		**163.0169**

10.0 Vegetation

Delta Research Station Alt 1 145 workers existing

Statewide , Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Research & Development	66.50	1000sqft	1.53	66,500.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	308.00	Space	2.77	123,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	54
Climate Zone	4			**Operational Year**	2014
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - no construction

Off-road Equipment -

Grading -

Vehicle Trips - Assigned ratio of trips to R&D based on number of workers 145, Monday through Saturday.

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Energy Use -

Operational Off-Road Equipment - Assumed a forklift.

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	20.00	0.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	9.65
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	8.11	9.65
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Energy	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934
Mobile	3.2927	8.5971	34.3425	0.0495	3.4151	0.1252	3.5402	0.9128	0.1149	1.0277		4,591.8606	4,591.8606	0.2247		4,596.5789
Offroad	0.2494	2.1500	1.2807	1.5200e-003		0.1801	0.1801		0.1657	0.1657		162.0115	162.0115	0.0479		163.0169
Total	**10.9280**	**11.5362**	**36.3363**	**0.0557**	**3.4151**	**0.3654**	**3.7805**	**0.9128**	**0.3407**	**1.2535**		**5,700.4096**	**5,700.4096**	**0.2910**	**0.0174**	**5,711.8997**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Energy	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934
Mobile	3.2927	8.5971	34.3425	0.0495	3.4151	0.1252	3.5402	0.9128	0.1149	1.0277		4,591.860 6	4,591.860 6	0.2247		4,596.578 9
Offroad	0.2494	2.1500	1.2807	1.5200e-003		0.1801	0.1801		0.1657	0.1657		162.0115	162.0115	0.0479		163.0169
Total	**10.9280**	**11.5362**	**36.3363**	**0.0557**	**3.4151**	**0.3654**	**3.7805**	**0.9128**	**0.3407**	**1.2535**		**5,700.409 6**	**5,700.409 6**	**0.2910**	**0.0174**	**5,711.899 7**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**2.28**	**18.64**	**3.52**	**2.73**	**0.00**	**49.29**	**4.76**	**0.00**	**48.64**	**13.22**	**0.00**	**2.84**	**2.84**	**16.45**	**0.00**	**2.85**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	12/31/2015	5	0	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.2927	8.5971	34.3425	0.0495	3.4151	0.1252	3.5402	0.9128	0.1149	1.0277		4,591.8606	4,591.8606	0.2247		4,596.5789
Unmitigated	3.2927	8.5971	34.3425	0.0495	3.4151	0.1252	3.5402	0.9128	0.1149	1.0277		4,591.8606	4,591.8606	0.2247		4,596.5789

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Light Industry	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	641.73	641.73	0.00	1,378,561	1,378,561
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	641.73	641.73	0.00	1,378,561	1,378,561

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.494080	0.063211	0.178687	0.145921	0.045614	0.006804	0.014884	0.037486	0.001879	0.002258	0.005933	0.000705	0.002538

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: Y

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934
NaturalGas Unmitigated	0.0868	0.7887	0.6625	4.7300e-003		0.0599	0.0599		0.0599	0.0599		946.4335	946.4335	0.0181	0.0174	952.1934

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1803.08	0.0195	0.1768	0.1485	1.0600e-003		0.0134	0.0134		0.0134	0.0134		212.1273	212.1273	4.0700e-003	3.8900e-003	213.4183
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	5329.11	0.0575	0.5225	0.4389	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.9541	626.9541	0.0120	0.0115	630.7696
Unrefrigerated Warehouse-No Rail	210.575	2.2700e-003	0.0206	0.0173	1.2000e-004		1.5700e-003	1.5700e-003		1.5700e-003	1.5700e-003		24.7736	24.7736	4.7000e-004	4.5000e-004	24.9243
Unrefrigerated Warehouse-No Rail	701.918	7.5700e-003	0.0688	0.0578	4.1000e-004		5.2300e-003	5.2300e-003		5.2300e-003	5.2300e-003		82.5786	82.5786	1.5800e-003	1.5100e-003	83.0811
Total		**0.0868**	**0.7887**	**0.6625**	**4.7200e-003**		**0.0599**	**0.0599**		**0.0599**	**0.0599**		**946.4335**	**946.4335**	**0.0181**	**0.0173**	**952.1934**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.80308	0.0195	0.1768	0.1485	1.0600e-003		0.0134	0.0134		0.0134	0.0134		212.1273	212.1273	4.0700e-003	3.8900e-003	213.4183
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	5.32911	0.0575	0.5225	0.4389	3.1300e-003		0.0397	0.0397		0.0397	0.0397		626.9541	626.9541	0.0120	0.0115	630.7696
Unrefrigerated Warehouse-No Rail	0.210575	2.2700e-003	0.0206	0.0173	1.2000e-004		1.5700e-003	1.5700e-003		1.5700e-003	1.5700e-003		24.7736	24.7736	4.7000e-004	4.5000e-004	24.9243
Unrefrigerated Warehouse-No Rail	0.701918	7.5700e-003	0.0688	0.0578	4.1000e-004		5.2300e-003	5.2300e-003		5.2300e-003	5.2300e-003		82.5786	82.5786	1.5800e-003	1.5100e-003	83.0811
Total		**0.0868**	**0.7887**	**0.6625**	**4.7200e-003**		**0.0599**	**0.0599**		**0.0599**	**0.0599**		**946.4335**	**946.4335**	**0.0181**	**0.0173**	**952.1934**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Unmitigated	7.2992	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0838					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.2103					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.1200e-003	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Total	**7.2992**	**4.9000e-004**	**0.0507**	**0.0000**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**		**0.1040**	**0.1040**	**3.1000e-004**		**0.1105**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.0838					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.2103					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.1200e-003	4.9000e-004	0.0507	0.0000		1.8000e-004	1.8000e-004		1.8000e-004	1.8000e-004		0.1040	0.1040	3.1000e-004		0.1105
Total	**7.2992**	**4.9000e-004**	**0.0507**	**0.0000**		**1.8000e-004**	**1.8000e-004**		**1.8000e-004**	**1.8000e-004**		**0.1040**	**0.1040**	**3.1000e-004**		**0.1105**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.2494	2.1500	1.2807	1.5200e-003		0.1801	0.1801		0.1657	0.1657		162.0115	162.0115	0.0479		163.0169
Total	**0.2494**	**2.1500**	**1.2807**	**1.5200e-003**		**0.1801**	**0.1801**		**0.1657**	**0.1657**		**162.0115**	**162.0115**	**0.0479**		**163.0169**

10.0 Vegetation

Delta Research Station Alt 1 145 workers existing

Statewide , Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Concrete/Industrial Saws	Diesel	No Change	0	1	No Change	0.00
Excavators	Diesel	No Change	0	3	No Change	0.00
Rubber Tired Dozers	Diesel	No Change	0	2	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Unmitigated tons/yr							Unmitigated mt/yr					

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Mitigated tons/yr							Mitigated mt/yr					

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			
No	Replace Ground Cover of Area Disturbed	PM10 Reduction		PM2.5 Reduction			
No	Water Exposed Area	PM10 Reduction		PM2.5 Reduction		Frequency (per day)	
No	Unpaved Road Mitigation	Moisture Content %		Vehicle Speed (mph)			
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5

Operational Percent Reduction Summary

Category	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Architectural Coating	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Consumer Products	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Electricity	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hearth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Landscaping	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Natural Gas	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Water Indoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.14	0.01
Water Outdoor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Operational Mobile Mitigation

Project Setting:

Mitigation	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.21	0.50		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

No	Neighborhood Enhancements	Improve Pedestrian Network				
No	Neighborhood Enhancements	Provide Traffic Calming Measures				
No	Neighborhood Enhancements	Implement NEV Network	0.00			
	Neighborhood Enhancements	Neighborhood Enhancements Subtotal	0.00			
No	Parking Policy Pricing	Limit Parking Supply	0.00			
No	Parking Policy Pricing	Unbundle Parking Costs	0.00			
No	Parking Policy Pricing	On-street Market Pricing	0.00			
	Parking Policy Pricing	Parking Policy Pricing Subtotal	0.00			
No	Transit Improvements	Provide BRT System	0.00			
No	Transit Improvements	Expand Transit Network	0.00			
No	Transit Improvements	Increase Transit Frequency	0.00			
	Transit Improvements	Transit Improvements Subtotal	0.00			
		Land Use and Site Enhancement Subtotal	0.00			
No	Commute	Implement Trip Reduction Program				
No	Commute	Transit Subsidy				
No	Commute	Implement Employee Parking "Cash Out"				
No	Commute	Workplace Parking Charge				
No	Commute	Encourage Telecommuting and Alternative Work Schedules	0.00			
No	Commute	Market Commute Trip Reduction Option	0.00			
No	Commute	Employee Vanpool/Shuttle	0.00		2.00	
No	Commute	Provide Ride Sharing Program				
	Commute	Commute Subtotal	0.00			

No	School Trip	Implement School Bus Program	0.00			
		Total VMT Reduction	0.00			

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	250.00
No	Use Low VOC Paint (Residential Exterior)	250.00
No	Use Low VOC Paint (Non-residential Interior)	250.00
No	Use Low VOC Paint (Non-residential Exterior)	250.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Exceed Title 24		
No	Install High Efficiency Lighting		
No	On-site Renewable		

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00

DishWasher			15.00
Fan			50.00
Refrigerator			15.00

Water Mitigation Measures

Measure Implemented	Mitigation Measure	Input Value 1	Input Value 2
No	Apply Water Conservation on Strategy		
No	Use Reclaimed Water		
No	Use Grey Water		
No	Install low-flow bathroom faucet	32.00	
No	Install low-flow Kitchen faucet	18.00	
No	Install low-flow Toilet	20.00	
No	Install low-flow Shower	20.00	
No	Turf Reduction		
No	Use Water Efficient Irrigation Systems	6.10	
No	Water Efficient Landscape		

Solid Waste Mitigation

Mitigation Measures	Input Value
Institute Recycling and Composting Services Percent Reduction in Waste Disposed	

Delta Research Station Alt 2

Sacramento Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	2.50	1000sqft	0.06	2,500.00	0
Research & Development	66.50	1000sqft	1.53	66,500.00	0
Research & Development	39.50	1000sqft	0.91	39,500.00	0
General Heavy Industry	6.00	1000sqft	0.14	6,000.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	298.00	Space	2.68	119,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	65
Climate Zone	4			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Demolition -

Grading - Adjusted acres disturbed on site preparation ber table 3-4.

Vehicle Trips - Assigned the 797 daily trips to Research and Development. Assumed Monday through Saturday trips at same rate.

Operational Off-Road Equipment - Assumed one forklift

Table Name	Column Name	Default Value	New Value
tblGrading	AcresOfGrading	0.00	14.00
tblGrading	MaterialExported	0.00	61,866.00
tblGrading	MaterialImported	0.00	61,866.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	7.52
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	68.93	0.00
tblVehicleTrips	WD_TR	8.11	7.52
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.7864	6.7936	6.5136	0.0122	0.4596	0.3081	0.7677	0.1629	0.2877	0.4507	0.0000	1,090.0778	1,090.0778	0.0977	0.0000	1,092.1299
2017	2.5997	0.5259	0.4817	7.9000e-004	0.0163	0.0308	0.0472	4.4200e-003	0.0288	0.0332	0.0000	68.2395	68.2395	0.0129	0.0000	68.5099
Total	**3.3860**	**7.3194**	**6.9953**	**0.0130**	**0.4759**	**0.3389**	**0.8148**	**0.1674**	**0.3165**	**0.4839**	**0.0000**	**1,158.3173**	**1,158.3173**	**0.1106**	**0.0000**	**1,160.6397**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.7864	6.7936	6.5136	0.0122	0.4596	0.3081	0.7677	0.1629	0.2877	0.4507	0.0000	1,090.0774	1,090.0774	0.0977	0.0000	1,092.1295
2017	2.5997	0.5259	0.4817	7.9000e-004	0.0163	0.0308	0.0472	4.4200e-003	0.0288	0.0332	0.0000	68.2394	68.2394	0.0129	0.0000	68.5098
Total	**3.3860**	**7.3194**	**6.9953**	**0.0130**	**0.4759**	**0.3389**	**0.8148**	**0.1674**	**0.3165**	**0.4839**	**0.0000**	**1,158.3168**	**1,158.3168**	**0.1106**	**0.0000**	**1,160.6393**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.5590	5.0000e-005	4.8000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.1700e-003	9.1700e-003	3.0000e-005	0.0000	9.7000e-003
Energy	0.0217	0.1968	0.1653	1.1800e-003		0.0150	0.0150		0.0150	0.0150	0.0000	699.7564	699.7564	0.0261	8.4700e-003	702.9293
Mobile	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430
Offroad	0.0274	0.2374	0.1624	2.0000e-004		0.0196	0.0196		0.0180	0.0180	0.0000	18.4278	18.4278	5.6500e-003	0.0000	18.5463
Waste						0.0000	0.0000		0.0000	0.0000	24.1661	0.0000	24.1661	1.4282	0.0000	54.1577
Water						0.0000	0.0000		0.0000	0.0000	24.5061	121.9019	146.4080	2.5225	0.0606	218.1584
Total	**2.0999**	**1.7561**	**5.5234**	**0.0113**	**0.6377**	**0.0517**	**0.6894**	**0.1711**	**0.0487**	**0.2198**	**48.6721**	**1,609.3971**	**1,658.0693**	**4.0130**	**0.0690**	**1,763.7444**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.5590	5.0000e-005	4.8000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.1700e-003	9.1700e-003	3.0000e-005	0.0000	9.7000e-003
Energy	0.0217	0.1968	0.1653	1.1800e-003		0.0150	0.0150		0.0150	0.0150	0.0000	699.7564	699.7564	0.0261	8.4700e-003	702.9293
Mobile	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430
Offroad	0.0274	0.2374	0.1624	2.0000e-004		0.0196	0.0196		0.0180	0.0180	0.0000	18.4278	18.4278	5.6500e-003	0.0000	18.5463
Waste						0.0000	0.0000		0.0000	0.0000	24.1661	0.0000	24.1661	1.4282	0.0000	54.1577
Water						0.0000	0.0000		0.0000	0.0000	24.5061	121.9019	146.4080	2.5221	0.0605	218.1193
Total	**2.0999**	**1.7561**	**5.5234**	**0.0113**	**0.6377**	**0.0517**	**0.6894**	**0.1711**	**0.0487**	**0.2198**	**48.6721**	**1,609.3971**	**1,658.0693**	**4.0125**	**0.0690**	**1,763.7053**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.31**	**13.52**	**2.94**	**1.77**	**0.00**	**37.93**	**2.84**	**0.00**	**37.00**	**8.20**	**0.00**	**1.15**	**1.11**	**0.15**	**0.13**	**1.05**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/10/2016	5	20	
4	Building Construction	Building Construction	3/11/2016	1/26/2017	5	230	
5	Paving	Paving	1/27/2017	2/23/2017	5	20	
6	Architectural Coating	Architectural Coating	2/24/2017	3/23/2017	5	20	

Acres of Grading (Site Preparation Phase): 14

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 327,864; Non-Residential Outdoor: 109,288 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	38.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	7,733.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	7,733.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	130.00	55.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	26.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.2400e-003	0.0000	4.2400e-003	6.4000e-004	0.0000	6.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0974	37.0974	0.0101	0.0000	37.3092
Total	**0.0429**	**0.4566**	**0.3503**	**4.0000e-004**	**4.2400e-003**	**0.0229**	**0.0272**	**6.4000e-004**	**0.0214**	**0.0220**	**0.0000**	**37.0974**	**37.0974**	**0.0101**	**0.0000**	**37.3092**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.7000e-004	5.0500e-003	5.3200e-003	1.0000e-005	3.2000e-004	8.0000e-005	4.0000e-004	9.0000e-005	7.0000e-005	1.6000e-004	0.0000	1.2899	1.2899	1.0000e-005	0.0000	1.2901
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**1.0300e-003**	**5.7600e-003**	**0.0125**	**2.0000e-005**	**1.5000e-003**	**9.0000e-005**	**1.5900e-003**	**4.1000e-004**	**8.0000e-005**	**4.8000e-004**	**0.0000**	**2.3545**	**2.3545**	**7.0000e-005**	**0.0000**	**2.3560**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					4.2400e-003	0.0000	4.2400e-003	6.4000e-004	0.0000	6.4000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0973	37.0973	0.0101	0.0000	37.3092
Total	**0.0429**	**0.4566**	**0.3503**	**4.0000e-004**	**4.2400e-003**	**0.0229**	**0.0272**	**6.4000e-004**	**0.0214**	**0.0220**	**0.0000**	**37.0973**	**37.0973**	**0.0101**	**0.0000**	**37.3092**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	4.7000e-004	5.0500e-003	5.3200e-003	1.0000e-005	3.2000e-004	8.0000e-005	4.0000e-004	9.0000e-005	7.0000e-005	1.6000e-004	0.0000	1.2899	1.2899	1.0000e-005	0.0000	1.2901
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**1.0300e-003**	**5.7600e-003**	**0.0125**	**2.0000e-005**	**1.5000e-003**	**9.0000e-005**	**1.5900e-003**	**4.1000e-004**	**8.0000e-005**	**4.8000e-004**	**0.0000**	**2.3545**	**2.3545**	**7.0000e-005**	**0.0000**	**2.3560**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1042	0.0000	0.1042	0.0514	0.0000	0.0514	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4386	18.4386	5.5600e-003	0.0000	18.5554
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.1042**	**0.0147**	**0.1188**	**0.0514**	**0.0135**	**0.0649**	**0.0000**	**18.4386**	**18.4386**	**5.5600e-003**	**0.0000**	**18.5554**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0950	1.0272	1.0817	2.8800e-003	0.0652	0.0155	0.0807	0.0179	0.0143	0.0322	0.0000	262.4859	262.4859	1.8700e-003	0.0000	262.5252
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	4.3000e-004	4.2800e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6388	0.6388	4.0000e-005	0.0000	0.6395
Total	**0.0953**	**1.0277**	**1.0860**	**2.8900e-003**	**0.0659**	**0.0155**	**0.0814**	**0.0181**	**0.0143**	**0.0324**	**0.0000**	**263.1247**	**263.1247**	**1.9100e-003**	**0.0000**	**263.1647**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.1042	0.0000	0.1042	0.0514	0.0000	0.0514	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4385	18.4385	5.5600e-003	0.0000	18.5553
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.1042**	**0.0147**	**0.1188**	**0.0514**	**0.0135**	**0.0649**	**0.0000**	**18.4385**	**18.4385**	**5.5600e-003**	**0.0000**	**18.5553**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0950	1.0272	1.0817	2.8800e-003	0.0652	0.0155	0.0807	0.0179	0.0143	0.0322	0.0000	262.4859	262.4859	1.8700e-003	0.0000	262.5252
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	4.3000e-004	4.2800e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6388	0.6388	4.0000e-005	0.0000	0.6395
Total	**0.0953**	**1.0277**	**1.0860**	**2.8900e-003**	**0.0659**	**0.0155**	**0.0814**	**0.0181**	**0.0143**	**0.0324**	**0.0000**	**263.1247**	**263.1247**	**1.9100e-003**	**0.0000**	**263.1647**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0719	0.0000	0.0719	0.0346	0.0000	0.0346	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0367	0.3845	0.2608	3.0000e-004		0.0220	0.0220		0.0202	0.0202	0.0000	28.0664	28.0664	8.4700e-003	0.0000	28.2442
Total	**0.0367**	**0.3845**	**0.2608**	**3.0000e-004**	**0.0719**	**0.0220**	**0.0939**	**0.0346**	**0.0202**	**0.0549**	**0.0000**	**28.0664**	**28.0664**	**8.4700e-003**	**0.0000**	**28.2442**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0950	1.0272	1.0817	2.8800e-003	0.0652	0.0155	0.0807	0.0179	0.0143	0.0322	0.0000	262.4859	262.4859	1.8700e-003	0.0000	262.5252
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**0.0955**	**1.0279**	**1.0889**	**2.8900e-003**	**0.0664**	**0.0155**	**0.0819**	**0.0182**	**0.0143**	**0.0325**	**0.0000**	**263.5506**	**263.5506**	**1.9300e-003**	**0.0000**	**263.5911**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0719	0.0000	0.0719	0.0346	0.0000	0.0346	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0367	0.3845	0.2608	3.0000e-004		0.0220	0.0220		0.0202	0.0202	0.0000	28.0664	28.0664	8.4700e-003	0.0000	28.2441
Total	**0.0367**	**0.3845**	**0.2608**	**3.0000e-004**	**0.0719**	**0.0220**	**0.0939**	**0.0346**	**0.0202**	**0.0549**	**0.0000**	**28.0664**	**28.0664**	**8.4700e-003**	**0.0000**	**28.2441**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0950	1.0272	1.0817	2.8800e-003	0.0652	0.0155	0.0807	0.0179	0.0143	0.0322	0.0000	262.4859	262.4859	1.8700e-003	0.0000	262.5252
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**0.0955**	**1.0279**	**1.0889**	**2.8900e-003**	**0.0664**	**0.0155**	**0.0819**	**0.0182**	**0.0143**	**0.0325**	**0.0000**	**263.5506**	**263.5506**	**1.9300e-003**	**0.0000**	**263.5911**

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3594	3.0074	1.9525	2.8300e-003		0.2076	0.2076		0.1950	0.1950	0.0000	255.4720	255.4720	0.0634	0.0000	256.8026
Total	**0.3594**	**3.0074**	**1.9525**	**2.8300e-003**		**0.2076**	**0.2076**		**0.1950**	**0.1950**	**0.0000**	**255.4720**	**255.4720**	**0.0634**	**0.0000**	**256.8026**

3.5 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0794	0.5457	0.9044	1.3700e-003	0.0372	8.8900e-003	0.0461	0.0107	8.1700e-003	0.0188	0.0000	124.6270	124.6270	9.9000e-004	0.0000	124.6478
Worker	0.0509	0.0650	0.6528	1.3100e-003	0.1083	8.5000e-004	0.1092	0.0288	7.7000e-004	0.0296	0.0000	97.3466	97.3466	5.3500e-003	0.0000	97.4590
Total	**0.1302**	**0.6106**	**1.5572**	**2.6800e-003**	**0.1456**	**9.7400e-003**	**0.1553**	**0.0395**	**8.9400e-003**	**0.0484**	**0.0000**	**221.9736**	**221.9736**	**6.3400e-003**	**0.0000**	**222.1068**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3594	3.0074	1.9525	2.8300e-003		0.2076	0.2076		0.1950	0.1950	0.0000	255.4717	255.4717	0.0634	0.0000	256.8023
Total	**0.3594**	**3.0074**	**1.9525**	**2.8300e-003**		**0.2076**	**0.2076**		**0.1950**	**0.1950**	**0.0000**	**255.4717**	**255.4717**	**0.0634**	**0.0000**	**256.8023**

3.5 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0794	0.5457	0.9044	1.3700e-003	0.0372	8.8900e-003	0.0461	0.0107	8.1700e-003	0.0188	0.0000	124.6270	124.6270	9.9000e-004	0.0000	124.6478
Worker	0.0509	0.0650	0.6528	1.3100e-003	0.1083	8.5000e-004	0.1092	0.0288	7.7000e-004	0.0296	0.0000	97.3466	97.3466	5.3500e-003	0.0000	97.4590
Total	**0.1302**	**0.6106**	**1.5572**	**2.6800e-003**	**0.1456**	**9.7400e-003**	**0.1553**	**0.0395**	**8.9400e-003**	**0.0484**	**0.0000**	**221.9736**	**221.9736**	**6.3400e-003**	**0.0000**	**222.1068**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0295	0.2509	0.1722	2.5000e-004		0.0169	0.0169		0.0159	0.0159	0.0000	22.7505	22.7505	5.6000e-003	0.0000	22.8681
Total	**0.0295**	**0.2509**	**0.1722**	**2.5000e-004**		**0.0169**	**0.0169**		**0.0159**	**0.0159**	**0.0000**	**22.7505**	**22.7505**	**5.6000e-003**	**0.0000**	**22.8681**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2100e-003	0.0433	0.0747	1.2000e-004	3.3500e-003	6.7000e-004	4.0300e-003	9.6000e-004	6.2000e-004	1.5800e-003	0.0000	11.0300	11.0300	8.0000e-005	0.0000	11.0318
Worker	3.9900e-003	5.1800e-003	0.0517	1.2000e-004	9.7500e-003	7.0000e-005	9.8300e-003	2.5900e-003	7.0000e-005	2.6600e-003	0.0000	8.4177	8.4177	4.4000e-004	0.0000	8.4269
Total	**0.0102**	**0.0485**	**0.1264**	**2.4000e-004**	**0.0131**	**7.4000e-004**	**0.0139**	**3.5500e-003**	**6.9000e-004**	**4.2400e-003**	**0.0000**	**19.4478**	**19.4478**	**5.2000e-004**	**0.0000**	**19.4587**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0295	0.2509	0.1722	2.5000e-004		0.0169	0.0169		0.0159	0.0159	0.0000	22.7505	22.7505	5.6000e-003	0.0000	22.8681
Total	**0.0295**	**0.2509**	**0.1722**	**2.5000e-004**		**0.0169**	**0.0169**		**0.0159**	**0.0159**	**0.0000**	**22.7505**	**22.7505**	**5.6000e-003**	**0.0000**	**22.8681**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2100e-003	0.0433	0.0747	1.2000e-004	3.3500e-003	6.7000e-004	4.0300e-003	9.6000e-004	6.2000e-004	1.5800e-003	0.0000	11.0300	11.0300	8.0000e-005	0.0000	11.0318
Worker	3.9900e-003	5.1800e-003	0.0517	1.2000e-004	9.7500e-003	7.0000e-005	9.8300e-003	2.5900e-003	7.0000e-005	2.6600e-003	0.0000	8.4177	8.4177	4.4000e-004	0.0000	8.4269
Total	**0.0102**	**0.0485**	**0.1264**	**2.4000e-004**	**0.0131**	**7.4000e-004**	**0.0139**	**3.5500e-003**	**6.9000e-004**	**4.2400e-003**	**0.0000**	**19.4478**	**19.4478**	**5.2000e-004**	**0.0000**	**19.4587**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266
Paving	3.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0226**	**0.2030**	**0.1473**	**2.2000e-004**		**0.0114**	**0.0114**		**0.0105**	**0.0105**	**0.0000**	**20.6934**	**20.6934**	**6.3400e-003**	**0.0000**	**20.8266**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	6.3000e-004	6.2800e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0224	1.0224	5.0000e-005	0.0000	1.0235
Total	**4.8000e-004**	**6.3000e-004**	**6.2800e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1900e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0224**	**1.0224**	**5.0000e-005**	**0.0000**	**1.0235**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265
Paving	3.5100e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0226**	**0.2030**	**0.1473**	**2.2000e-004**		**0.0114**	**0.0114**		**0.0105**	**0.0105**	**0.0000**	**20.6934**	**20.6934**	**6.3400e-003**	**0.0000**	**20.8265**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	6.3000e-004	6.2800e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0224	1.0224	5.0000e-005	0.0000	1.0235
Total	**4.8000e-004**	**6.3000e-004**	**6.2800e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1900e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0224**	**1.0224**	**5.0000e-005**	**0.0000**	**1.0235**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.5328					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3200e-003	0.0219	0.0187	3.0000e-005		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	2.5533	2.5533	2.7000e-004	0.0000	2.5589
Total	**2.5361**	**0.0219**	**0.0187**	**3.0000e-005**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**2.5533**	**2.5533**	**2.7000e-004**	**0.0000**	**2.5589**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.4000e-004	1.0900e-003	0.0109	2.0000e-005	2.0500e-003	2.0000e-005	2.0700e-003	5.5000e-004	1.0000e-005	5.6000e-004	0.0000	1.7722	1.7722	9.0000e-005	0.0000	1.7741
Total	**8.4000e-004**	**1.0900e-003**	**0.0109**	**2.0000e-005**	**2.0500e-003**	**2.0000e-005**	**2.0700e-003**	**5.5000e-004**	**1.0000e-005**	**5.6000e-004**	**0.0000**	**1.7722**	**1.7722**	**9.0000e-005**	**0.0000**	**1.7741**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.5328					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3200e-003	0.0219	0.0187	3.0000e-005		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	2.5533	2.5533	2.7000e-004	0.0000	2.5589
Total	**2.5361**	**0.0219**	**0.0187**	**3.0000e-005**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**2.5533**	**2.5533**	**2.7000e-004**	**0.0000**	**2.5589**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.4000e-004	1.0900e-003	0.0109	2.0000e-005	2.0500e-003	2.0000e-005	2.0700e-003	5.5000e-004	1.0000e-005	5.6000e-004	0.0000	1.7722	1.7722	9.0000e-005	0.0000	1.7741
Total	**8.4000e-004**	**1.0900e-003**	**0.0109**	**2.0000e-005**	**2.0500e-003**	**2.0000e-005**	**2.0700e-003**	**5.5000e-004**	**1.0000e-005**	**5.6000e-004**	**0.0000**	**1.7722**	**1.7722**	**9.0000e-005**	**0.0000**	**1.7741**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	tons/yr										MT/yr					
Mitigated	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430
Unmitigated	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Light Industry	0.00	0.00	0.00		
Government Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	500.08	500.08	0.00	1,074,278	1,074,278
Research & Development	297.04	297.04	0.00	638,105	638,105
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	797.12	797.12	0.00	1,712,383	1,712,383

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Government Office Building	9.50	7.30	7.30	33.00	62.00	5.00	50	34	16
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	485.5330	485.5330	0.0220	4.5400e-003	487.4021
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	485.5330	485.5330	0.0220	4.5400e-003	487.4021
NaturalGas Mitigated	0.0217	0.1968	0.1653	1.1800e-003		0.0150	0.0150		0.0150	0.0150	0.0000	214.2234	214.2234	4.1100e-003	3.9300e-003	215.5271
NaturalGas Unmitigated	0.0217	0.1968	0.1653	1.1800e-003		0.0150	0.0150		0.0150	0.0150	0.0000	214.2234	214.2234	4.1100e-003	3.9300e-003	215.5271

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	616725	3.3300e-003	0.0302	0.0254	1.8000e-004		2.3000e-003	2.3000e-003		2.3000e-003	2.3000e-003	0.0000	32.9108	32.9108	6.3000e-004	6.0000e-004	33.1111
Government Office Building	43050	2.3000e-004	2.1100e-003	1.7700e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.2973	2.2973	4.0000e-005	4.0000e-005	2.3113
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.08269e+006	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0300e-003	4.0300e-003		4.0300e-003	4.0300e-003	0.0000	57.7767	57.7767	1.1100e-003	1.0600e-003	58.1284
Research & Development	1.82276e+006	9.8300e-003	0.0894	0.0751	5.4000e-004		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	97.2697	97.2697	1.8600e-003	1.7800e-003	97.8617
Unrefrigerated Warehouse-No Rail	219000	1.1800e-003	0.0107	9.0200e-003	6.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	11.6867	11.6867	2.2000e-004	2.1000e-004	11.7578
Unrefrigerated Warehouse-No Rail	65700	3.5000e-004	3.2200e-003	2.7100e-003	2.0000e-005		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	3.5060	3.5060	7.0000e-005	6.0000e-005	3.5273
General Heavy Industry	164460	8.9000e-004	8.0600e-003	6.7700e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004	0.0000	8.7762	8.7762	1.7000e-004	1.6000e-004	8.8296
Total		**0.0217**	**0.1968**	**0.1653**	**1.1800e-003**		**0.0150**	**0.0150**		**0.0150**	**0.0150**	**0.0000**	**214.2234**	**214.2234**	**4.1000e-003**	**3.9100e-003**	**215.5271**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	616725	3.3300e-003	0.0302	0.0254	1.8000e-004		2.3000e-003	2.3000e-003		2.3000e-003	2.3000e-003	0.0000	32.9108	32.9108	6.3000e-004	6.0000e-004	33.1111
Government Office Building	43050	2.3000e-004	2.1100e-003	1.7700e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.2973	2.2973	4.0000e-005	4.0000e-005	2.3113
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.08269e+006	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0300e-003	4.0300e-003		4.0300e-003	4.0300e-003	0.0000	57.7767	57.7767	1.1100e-003	1.0600e-003	58.1284
Research & Development	1.82276e+006	9.8300e-003	0.0894	0.0751	5.4000e-004		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	97.2697	97.2697	1.8600e-003	1.7800e-003	97.8617
Unrefrigerated Warehouse-No Rail	219000	1.1800e-003	0.0107	9.0200e-003	6.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	11.6867	11.6867	2.2000e-004	2.1000e-004	11.7578
Unrefrigerated Warehouse-No Rail	65700	3.5000e-004	3.2200e-003	2.7100e-003	2.0000e-005		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	3.5060	3.5060	7.0000e-005	6.0000e-005	3.5273
General Heavy Industry	164460	8.9000e-004	8.0600e-003	6.7700e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004	0.0000	8.7762	8.7762	1.7000e-004	1.6000e-004	8.8296
Total		**0.0217**	**0.1968**	**0.1653**	**1.1800e-003**		**0.0150**	**0.0150**		**0.0150**	**0.0150**	**0.0000**	**214.2234**	**214.2234**	**4.1000e-003**	**3.9100e-003**	**215.5271**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	54180	15.7616	7.1000e-004	1.5000e-004	15.8223
General Light Industry	203175	59.1059	2.6700e-003	5.5000e-004	59.3335
Government Office Building	49275	14.3347	6.5000e-004	1.3000e-004	14.3899
Parking Lot	104896	30.5155	1.3800e-003	2.9000e-004	30.6329
Research & Development	356685	103.7638	4.6900e-003	9.7000e-004	104.1632
Research & Development	600495	174.6909	7.9000e-003	1.6300e-003	175.3634
Unrefrigerated Warehouse-No Rail	231000	67.2006	3.0400e-003	6.3000e-004	67.4593
Unrefrigerated Warehouse-No Rail	69300	20.1602	9.1000e-004	1.9000e-004	20.2378
Total		**485.5330**	**0.0220**	**4.5400e-003**	**487.4021**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	54180	15.7616	7.1000e-004	1.5000e-004	15.8223
General Light Industry	203175	59.1059	2.6700e-003	5.5000e-004	59.3335
Government Office Building	49275	14.3347	6.5000e-004	1.3000e-004	14.3899
Parking Lot	104896	30.5155	1.3800e-003	2.9000e-004	30.6329
Research & Development	356685	103.7638	4.6900e-003	9.7000e-004	104.1632
Research & Development	600495	174.6909	7.9000e-003	1.6300e-003	175.3634
Unrefrigerated Warehouse-No Rail	231000	67.2006	3.0400e-003	6.3000e-004	67.4593
Unrefrigerated Warehouse-No Rail	69300	20.1602	9.1000e-004	1.9000e-004	20.2378
Total		**485.5330**	**0.0220**	**4.5400e-003**	**487.4021**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.5590	5.0000e-005	4.8000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.1700e-003	9.1700e-003	3.0000e-005	0.0000	9.7000e-003
Unmitigated	1.5590	5.0000e-005	4.8000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.1700e-003	9.1700e-003	3.0000e-005	0.0000	9.7000e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2533					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3052					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.6000e-004	5.0000e-005	4.8000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.1700e-003	9.1700e-003	3.0000e-005	0.0000	9.7000e-003
Total	**1.5590**	**5.0000e-005**	**4.8000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.1700e-003**	**9.1700e-003**	**3.0000e-005**	**0.0000**	**9.7000e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2533					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3052					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.6000e-004	5.0000e-005	4.8000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.1700e-003	9.1700e-003	3.0000e-005	0.0000	9.7000e-003
Total	**1.5590**	**5.0000e-005**	**4.8000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.1700e-003**	**9.1700e-003**	**3.0000e-005**	**0.0000**	**9.7000e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	146.4080	2.5221	0.0605	218.1193
Unmitigated	146.4080	2.5225	0.0606	218.1584

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	1.3875 / 0	2.6243	0.0453	1.0900e-003	3.9131
General Light Industry	5.20313 / 0	9.8411	0.1699	4.0800e-003	14.6740
Government Office Building	0.496649 / 0.304398	1.2493	0.0162	3.9000e-004	1.7118
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	52.1196 / 0	98.5777	1.7020	0.0409	146.9895
Unrefrigerated Warehouse-No Rail	18.0375 / 0	34.1157	0.5890	0.0141	50.8700
Total		**146.4080**	**2.5225**	**0.0606**	**218.1584**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	1.3875 / 0	2.6243	0.0453	1.0900e-003	3.9124
General Light Industry	5.20313 / 0	9.8411	0.1699	4.0700e-003	14.6714
Government Office Building	0.496649 / 0.304398	1.2493	0.0162	3.9000e-004	1.7115
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	52.1196 / 0	98.5777	1.7017	0.0408	146.9631
Unrefrigerated Warehouse-No Rail	18.0375 / 0	34.1157	0.5889	0.0141	50.8609
Total		**146.4080**	**2.5221**	**0.0605**	**218.1193**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	24.1661	1.4282	0.0000	54.1577
Unmitigated	24.1661	1.4282	0.0000	54.1577

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	7.44	1.5103	0.0893	0.0000	3.3846
General Light Industry	27.9	5.6635	0.3347	0.0000	12.6922
Government Office Building	2.33	0.4730	0.0280	0.0000	1.0600
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	8.06	1.6361	0.0967	0.0000	3.6666
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**24.1661**	**1.4282**	**0.0000**	**54.1577**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	7.44	1.5103	0.0893	0.0000	3.3846
General Light Industry	27.9	5.6635	0.3347	0.0000	12.6922
Government Office Building	2.33	0.4730	0.0280	0.0000	1.0600
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	8.06	1.6361	0.0967	0.0000	3.6666
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**24.1661**	**1.4282**	**0.0000**	**54.1577**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0274	0.2374	0.1624	2.0000e-004		0.0196	0.0196		0.0180	0.0180	0.0000	18.4278	18.4278	5.6500e-003	0.0000	18.5463
Total	**0.0274**	**0.2374**	**0.1624**	**2.0000e-004**		**0.0196**	**0.0196**		**0.0180**	**0.0180**	**0.0000**	**18.4278**	**18.4278**	**5.6500e-003**	**0.0000**	**18.5463**

10.0 Vegetation

Delta Research Station Alt 2

Sacramento Valley Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	2.50	1000sqft	0.06	2,500.00	0
Research & Development	66.50	1000sqft	1.53	66,500.00	0
Research & Development	39.50	1000sqft	0.91	39,500.00	0
General Heavy Industry	6.00	1000sqft	0.14	6,000.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	298.00	Space	2.68	119,200.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 3.5 **Precipitation Freq (Days)** 65

Climate Zone 4 **Operational Year** 2017

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Demolition -

Grading - Adjusted acres disturbed on site preparation ber table 3-4.

Vehicle Trips - Assigned the 797 daily trips to Research and Development. Assumed Monday through Saturday trips at same rate.

Operational Off-Road Equipment - Assumed one forklift

Table Name	Column Name	Default Value	New Value
tblGrading	AcresOfGrading	0.00	14.00
tblGrading	MaterialExported	0.00	61,866.00
tblGrading	MaterialImported	0.00	61,866.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	7.52
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	68.93	0.00
tblVehicleTrips	WD_TR	8.11	7.52
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	22.6723	248.8657	229.4710	0.6164	34.4685	6.0423	40.5108	14.0195	5.5566	19.5761	0.0000	62,146.0598	62,146.0598	1.6436	0.0000	62,180.5756
2017	253.7079	31.2331	30.8074	0.0535	1.4327	1.8595	3.2922	0.3873	1.7449	2.1322	0.0000	5,002.3179	5,002.3179	0.7099	0.0000	5,017.2256
Total	**276.3802**	**280.0988**	**260.2784**	**0.6699**	**35.9012**	**7.9018**	**43.8031**	**14.4068**	**7.3015**	**21.7083**	**0.0000**	**67,148.3777**	**67,148.3777**	**2.3535**	**0.0000**	**67,197.8012**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	22.6723	248.8657	229.4710	0.6164	34.4685	6.0423	40.5108	14.0195	5.5566	19.5761	0.0000	62,146.0598	62,146.0598	1.6436	0.0000	62,180.5756
2017	253.7079	31.2331	30.8074	0.0535	1.4327	1.8595	3.2922	0.3873	1.7449	2.1322	0.0000	5,002.3179	5,002.3179	0.7099	0.0000	5,017.2256
Total	**276.3802**	**280.0988**	**260.2784**	**0.6699**	**35.9012**	**7.9018**	**43.8031**	**14.4068**	**7.3015**	**21.7083**	**0.0000**	**67,148.3777**	**67,148.3777**	**2.3535**	**0.0000**	**67,197.8012**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.5448	5.1000e-004	0.0534	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1123	0.1123	3.1000e-004		0.1188
Energy	0.1186	1.0783	0.9058	6.4700e-003		0.0820	0.0820		0.0820	0.0820		1,293.9226	1,293.9226	0.0248	0.0237	1,301.7972
Mobile	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.0325	5,819.0325	0.2159		5,823.5654
Offroad	0.2109	1.8264	1.2491	1.5300e-003		0.1507	0.1507		0.1386	0.1386		156.2548	156.2548	0.0479		157.2602
Total	**12.3648**	**10.8150**	**36.1730**	**0.0763**	**4.2495**	**0.3421**	**4.5916**	**1.1367**	**0.3213**	**1.4579**		**7,269.3222**	**7,269.3222**	**0.2888**	**0.0237**	**7,282.7417**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.5448	5.1000e-004	0.0534	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1123	0.1123	3.1000e-004		0.1188
Energy	0.1186	1.0783	0.9058	6.4700e-003		0.0820	0.0820		0.0820	0.0820		1,293.9226	1,293.9226	0.0248	0.0237	1,301.7972
Mobile	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.0325	5,819.0325	0.2159		5,823.5654
Offroad	0.2109	1.8264	1.2491	1.5300e-003		0.1507	0.1507		0.1386	0.1386		156.2548	156.2548	0.0479		157.2602
Total	**12.3648**	**10.8150**	**36.1730**	**0.0763**	**4.2495**	**0.3421**	**4.5916**	**1.1367**	**0.3213**	**1.4579**		**7,269.3222**	**7,269.3222**	**0.2888**	**0.0237**	**7,282.7417**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**1.71**	**16.89**	**3.45**	**2.00**	**0.00**	**44.04**	**3.28**	**0.00**	**43.15**	**9.51**	**0.00**	**2.15**	**2.15**	**16.58**	**0.00**	**2.16**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/10/2016	5	20	
4	Building Construction	Building Construction	3/11/2016	1/26/2017	5	230	
5	Paving	Paving	1/27/2017	2/23/2017	5	20	
6	Architectural Coating	Architectural Coating	2/24/2017	3/23/2017	5	20	

Acres of Grading (Site Preparation Phase): 14

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 327,864; Non-Residential Outdoor: 109,288 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	38.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	7,733.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	7,733.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	130.00	55.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	26.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

<u>Unmitigated Construction On-Site</u>

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4236	0.0000	0.4236	0.0641	0.0000	0.0641			0.0000			0.0000
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365		4,089.284 1	4,089.284 1	1.1121		4,112.637 4
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**	**0.4236**	**2.2921**	**2.7158**	**0.0641**	**2.1365**	**2.2007**		**4,089.284 1**	**4,089.284 1**	**1.1121**		**4,112.637 4**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Hauling	0.0430	0.4770	0.4604	1.4100e-003	0.0332	7.6200e-003	0.0408	9.0800e-003	7.0100e-003	0.0161		142.3233	142.3233	1.0100e-003		142.3444
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**0.1093**	**0.5408**	**1.2785**	**2.9900e-003**	**0.1564**	**8.5400e-003**	**0.1649**	**0.0418**	**7.8600e-003**	**0.0496**		**271.8909**	**271.8909**	**7.4600e-003**		**272.0475**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category						lb/day								lb/day		
Fugitive Dust					0.4236	0.0000	0.4236	0.0641	0.0000	0.0641			0.0000			0.0000
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365	0.0000	4,089.2841	4,089.2841	1.1121		4,112.6374
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**	**0.4236**	**2.2921**	**2.7158**	**0.0641**	**2.1365**	**2.2007**	**0.0000**	**4,089.2841**	**4,089.2841**	**1.1121**		**4,112.6374**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0430	0.4770	0.4604	1.4100e-003	0.0332	7.6200e-003	0.0408	9.0800e-003	7.0100e-003	0.0161		142.3233	142.3233	1.0100e-003		142.3444
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**0.1093**	**0.5408**	**1.2785**	**2.9900e-003**	**0.1564**	**8.5400e-003**	**0.1649**	**0.0418**	**7.8600e-003**	**0.0496**		**271.8909**	**271.8909**	**7.4600e-003**		**272.0475**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					20.8304	0.0000	20.8304	10.2847	0.0000	10.2847			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**20.8304**	**2.9387**	**23.7691**	**10.2847**	**2.7036**	**12.9883**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	17.5157	194.1569	187.3840	0.5754	13.4903	3.1026	16.5928	3.6955	2.8520	6.5476		57,925.5734	57,925.5734	0.4097		57,934.1774
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0795	0.0765	0.9817	1.8900e-003	0.1479	1.1100e-003	0.1490	0.0392	1.0200e-003	0.0402		155.4812	155.4812	7.7400e-003		155.6437
Total	**17.5952**	**194.2334**	**188.3657**	**0.5773**	**13.6381**	**3.1037**	**16.7418**	**3.7348**	**2.8531**	**6.5878**		**58,081.0546**	**58,081.0546**	**0.4175**		**58,089.8212**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					20.8304	0.0000	20.8304	10.2847	0.0000	10.2847			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**20.8304**	**2.9387**	**23.7691**	**10.2847**	**2.7036**	**12.9883**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	17.5157	194.1569	187.3840	0.5754	13.4903	3.1026	16.5928	3.6955	2.8520	6.5476		57,925.5734	57,925.5734	0.4097		57,934.1774
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0795	0.0765	0.9817	1.8900e-003	0.1479	1.1100e-003	0.1490	0.0392	1.0200e-003	0.0402		155.4812	155.4812	7.7400e-003		155.6437
Total	**17.5952**	**194.2334**	**188.3657**	**0.5773**	**13.6381**	**3.1037**	**16.7418**	**3.7348**	**2.8531**	**6.5878**		**58,081.0546**	**58,081.0546**	**0.4175**		**58,089.8212**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.1921	0.0000	7.1921	3.4644	0.0000	3.4644			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225		3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**7.1921**	**2.1984**	**9.3905**	**3.4644**	**2.0225**	**5.4869**		**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.7579	97.0785	93.6920	0.2877	6.7451	1.5513	8.2964	1.8478	1.4260	3.2738		28,962.7867	28,962.7867	0.2049		28,967.0887
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**8.8241**	**97.1422**	**94.5101**	**0.2893**	**6.8684**	**1.5522**	**8.4206**	**1.8805**	**1.4269**	**3.3073**		**29,092.3544**	**29,092.3544**	**0.2113**		**29,096.7918**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.1921	0.0000	7.1921	3.4644	0.0000	3.4644			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225	0.0000	3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**7.1921**	**2.1984**	**9.3905**	**3.4644**	**2.0225**	**5.4869**	**0.0000**	**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.7579	97.0785	93.6920	0.2877	6.7451	1.5513	8.2964	1.8478	1.4260	3.2738		28,962.7867	28,962.7867	0.2049		28,967.0887
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**8.8241**	**97.1422**	**94.5101**	**0.2893**	**6.8684**	**1.5522**	**8.4206**	**1.8805**	**1.4269**	**3.3073**		**29,092.3544**	**29,092.3544**	**0.2113**		**29,096.7918**

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.5 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6814	4.9189	7.1497	0.0131	0.3648	0.0838	0.4486	0.1040	0.0770	0.1810		1,306.360 5	1,306.360 5	0.0102		1,306.575 5
Worker	0.5741	0.5523	7.0903	0.0137	1.0679	8.0100e-003	1.0759	0.2833	7.3300e-003	0.2906		1,122.919 4	1,122.919 4	0.0559		1,124.093 7
Total	**1.2555**	**5.4712**	**14.2401**	**0.0267**	**1.4327**	**0.0918**	**1.5245**	**0.3873**	**0.0843**	**0.4716**		**2,429.279 9**	**2,429.279 9**	**0.0662**		**2,430.669 2**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.286 4	2,669.286 4	0.6620		2,683.189 0
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.286 4**	**2,669.286 4**	**0.6620**		**2,683.189 0**

3.5 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6814	4.9189	7.1497	0.0131	0.3648	0.0838	0.4486	0.1040	0.0770	0.1810		1,306.360 5	1,306.360 5	0.0102		1,306.575 5
Worker	0.5741	0.5523	7.0903	0.0137	1.0679	8.0100e-003	1.0759	0.2833	7.3300e-003	0.2906		1,122.919 4	1,122.919 4	0.0559		1,124.093 7
Total	**1.2555**	**5.4712**	**14.2401**	**0.0267**	**1.4327**	**0.0918**	**1.5245**	**0.3873**	**0.0843**	**0.4716**		**2,429.279 9**	**2,429.279 9**	**0.0662**		**2,430.669 2**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.805 3	2,639.805 3	0.6497		2,653.449 0
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.805 3**	**2,639.805 3**	**0.6497**		**2,653.449 0**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5939	4.3378	6.4110	0.0130	0.3648	0.0706	0.4354	0.1040	0.0649	0.1689		1,283.994 0	1,283.994 0	9.5200e-003		1,284.193 9
Worker	0.5034	0.4896	6.2673	0.0137	1.0679	7.6600e-003	1.0756	0.2833	7.0500e-003	0.2903		1,078.518 6	1,078.518 6	0.0507		1,079.582 8
Total	**1.0973**	**4.8274**	**12.6783**	**0.0267**	**1.4327**	**0.0783**	**1.5110**	**0.3873**	**0.0719**	**0.4592**		**2,362.512 6**	**2,362.512 6**	**0.0602**		**2,363.776 6**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.805 3	2,639.805 3	0.6497		2,653.449 0
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.805 3**	**2,639.805 3**	**0.6497**		**2,653.449 0**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5939	4.3378	6.4110	0.0130	0.3648	0.0706	0.4354	0.1040	0.0649	0.1689		1,283.994 0	1,283.994 0	9.5200e-003		1,284.193 9
Worker	0.5034	0.4896	6.2673	0.0137	1.0679	7.6600e-003	1.0756	0.2833	7.0500e-003	0.2903		1,078.518 6	1,078.518 6	0.0507		1,079.582 8
Total	**1.0973**	**4.8274**	**12.6783**	**0.0267**	**1.4327**	**0.0783**	**1.5110**	**0.3873**	**0.0719**	**0.4592**		**2,362.512 6**	**2,362.512 6**	**0.0602**		**2,363.776 6**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.058 8	2,281.058 8	0.6989		2,295.736 0
Paving	0.3511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2585**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.058 8**	**2,281.058 8**	**0.6989**		**2,295.736 0**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0565	0.7232	1.5800e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		124.4445	124.4445	5.8500e-003		124.5672
Total	**0.0581**	**0.0565**	**0.7232**	**1.5800e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**124.4445**	**124.4445**	**5.8500e-003**		**124.5672**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.3511					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2585**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0565	0.7232	1.5800e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		124.4445	124.4445	5.8500e-003		124.5672
Total	**0.0581**	**0.0565**	**0.7232**	**1.5800e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**124.4445**	**124.4445**	**5.8500e-003**		**124.5672**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	253.2749					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**253.6073**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1007	0.0979	1.2535	2.7300e-003	0.2136	1.5300e-003	0.2151	0.0567	1.4100e-003	0.0581		215.7037	215.7037	0.0101		215.9166
Total	**0.1007**	**0.0979**	**1.2535**	**2.7300e-003**	**0.2136**	**1.5300e-003**	**0.2151**	**0.0567**	**1.4100e-003**	**0.0581**		**215.7037**	**215.7037**	**0.0101**		**215.9166**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	253.2749					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**253.6073**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1007	0.0979	1.2535	2.7300e-003	0.2136	1.5300e-003	0.2151	0.0567	1.4100e-003	0.0581		215.7037	215.7037	0.0101		215.9166
Total	**0.1007**	**0.0979**	**1.2535**	**2.7300e-003**	**0.2136**	**1.5300e-003**	**0.2151**	**0.0567**	**1.4100e-003**	**0.0581**		**215.7037**	**215.7037**	**0.0101**		**215.9166**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.032 5	5,819.032 5	0.2159		5,823.565 4
Unmitigated	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.032 5	5,819.032 5	0.2159		5,823.565 4

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Light Industry	0.00	0.00	0.00		
Government Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	500.08	500.08	0.00	1,074,278	1,074,278
Research & Development	297.04	297.04	0.00	638,105	638,105
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	797.12	797.12	0.00	1,712,383	1,712,383

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Government Office Building	9.50	7.30	7.30	33.00	62.00	5.00	50	34	16
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1186	1.0783	0.9058	6.4700e-003		0.0820	0.0820		0.0820	0.0820		1,293.9226	1,293.9226	0.0248	0.0237	1,301.7972
NaturalGas Unmitigated	0.1186	1.0783	0.9058	6.4700e-003		0.0820	0.0820		0.0820	0.0820		1,293.9226	1,293.9226	0.0248	0.0237	1,301.7972

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1689.66	0.0182	0.1657	0.1392	9.9000e-004		0.0126	0.0126		0.0126	0.0126		198.7832	198.7832	3.8100e-003	3.6400e-003	199.9930
Government Office Building	117.945	1.2700e-003	0.0116	9.7100e-003	7.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		13.8759	13.8759	2.7000e-004	2.5000e-004	13.9604
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	2966.29	0.0320	0.2908	0.2443	1.7400e-003		0.0221	0.0221		0.0221	0.0221		348.9750	348.9750	6.6900e-003	6.4000e-003	351.0988
Research & Development	4993.88	0.0539	0.4896	0.4113	2.9400e-003		0.0372	0.0372		0.0372	0.0372		587.5149	587.5149	0.0113	0.0108	591.0904
Unrefrigerated Warehouse-No Rail	180	1.9400e-003	0.0177	0.0148	1.1000e-004		1.3400e-003	1.3400e-003		1.3400e-003	1.3400e-003		21.1765	21.1765	4.1000e-004	3.9000e-004	21.3054
Unrefrigerated Warehouse-No Rail	600	6.4700e-003	0.0588	0.0494	3.5000e-004		4.4700e-003	4.4700e-003		4.4700e-003	4.4700e-003		70.5882	70.5882	1.3500e-003	1.2900e-003	71.0178
General Heavy Industry	450.575	4.8600e-003	0.0442	0.0371	2.7000e-004		3.3600e-003	3.3600e-003		3.3600e-003	3.3600e-003		53.0089	53.0089	1.0200e-003	9.7000e-004	53.3315
Total		**0.1186**	**1.0783**	**0.9057**	**6.4700e-003**		**0.0820**	**0.0820**		**0.0820**	**0.0820**		**1,293.9227**	**1,293.9227**	**0.0248**	**0.0237**	**1,301.7972**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.68966	0.0182	0.1657	0.1392	9.9000e-004		0.0126	0.0126		0.0126	0.0126		198.7832	198.7832	3.8100e-003	3.6400e-003	199.9930
Government Office Building	0.117945	1.2700e-003	0.0116	9.7100e-003	7.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		13.8759	13.8759	2.7000e-004	2.5000e-004	13.9604
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	2.96629	0.0320	0.2908	0.2443	1.7400e-003		0.0221	0.0221		0.0221	0.0221		348.9750	348.9750	6.6900e-003	6.4000e-003	351.0988
Research & Development	4.99388	0.0539	0.4896	0.4113	2.9400e-003		0.0372	0.0372		0.0372	0.0372		587.5149	587.5149	0.0113	0.0108	591.0904
Unrefrigerated Warehouse-No Rail	0.18	1.9400e-003	0.0177	0.0148	1.1000e-004		1.3400e-003	1.3400e-003		1.3400e-003	1.3400e-003		21.1765	21.1765	4.1000e-004	3.9000e-004	21.3054
Unrefrigerated Warehouse-No Rail	0.6	6.4700e-003	0.0588	0.0494	3.5000e-004		4.4700e-003	4.4700e-003		4.4700e-003	4.4700e-003		70.5882	70.5882	1.3500e-003	1.2900e-003	71.0178
General Heavy Industry	0.450575	4.8600e-003	0.0442	0.0371	2.7000e-004		3.3600e-003	3.3600e-003		3.3600e-003	3.3600e-003		53.0089	53.0089	1.0200e-003	9.7000e-004	53.3315
Total		**0.1186**	**1.0783**	**0.9057**	**6.4700e-003**		**0.0820**	**0.0820**		**0.0820**	**0.0820**		**1,293.9227**	**1,293.9227**	**0.0248**	**0.0237**	**1,301.7972**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.5448	5.1000e-004	0.0534	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1123	0.1123	3.1000e-004		0.1188
Unmitigated	8.5448	5.1000e-004	0.0534	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1123	0.1123	3.1000e-004		0.1188

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3878					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.1519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.1500e-003	5.1000e-004	0.0534	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1123	0.1123	3.1000e-004		0.1188
Total	**8.5448**	**5.1000e-004**	**0.0534**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1123**	**0.1123**	**3.1000e-004**		**0.1188**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3878					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.1519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.1500e-003	5.1000e-004	0.0534	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1123	0.1123	3.1000e-004		0.1188
Total	**8.5448**	**5.1000e-004**	**0.0534**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1123**	**0.1123**	**3.1000e-004**		**0.1188**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.2109	1.8264	1.2491	1.5300e-003		0.1507	0.1507		0.1386	0.1386		156.2548	156.2548	0.0479		157.2602
Total	**0.2109**	**1.8264**	**1.2491**	**1.5300e-003**		**0.1507**	**0.1507**		**0.1386**	**0.1386**		**156.2548**	**156.2548**	**0.0479**		**157.2602**

10.0 Vegetation

Rio Vista In Channel Work

Sacramento Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	65
Climate Zone	4			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined land use to represent marina work in channel at Rio Vista. This run is for construction only.

Construction Phase - Construction schedule from Moffatt & Nichol. Conservatively assume 2016 dates.

Off-road Equipment - Tug represented as other material with hp 400, pile driving 350 hp other construction, work skiff other general industrial 400 hp

Off-road Equipment - General industrial = work skiff 400 hp

Off-road Equipment - Other general industrial= work skiff 400 hp

Off-road Equipment - Other construction = pile driver 350 hp
Other material = tug 400 hp
Other general industrial = skiff 400 hp

Demolition -

Grading -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	65.00
tblConstructionPhase	NumDays	0.00	5.00
tblGrading	MaterialExported	0.00	13,000.00
tblGrading	MaterialImported	0.00	2,000.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.1912	2.2429	1.2922	2.8600e-003	0.0371	0.0874	0.1246	0.0140	0.0809	0.0949	0.0000	265.3138	265.3138	0.0586	0.0000	266.5442
Total	**0.1912**	**2.2429**	**1.2922**	**2.8600e-003**	**0.0371**	**0.0874**	**0.1246**	**0.0140**	**0.0809**	**0.0949**	**0.0000**	**265.3138**	**265.3138**	**0.0586**	**0.0000**	**266.5442**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.1912	2.2429	1.2922	2.8600e-003	0.0371	0.0874	0.1246	0.0140	0.0809	0.0949	0.0000	265.3135	265.3135	0.0586	0.0000	266.5439
Total	**0.1912**	**2.2429**	**1.2922**	**2.8600e-003**	**0.0371**	**0.0874**	**0.1246**	**0.0140**	**0.0809**	**0.0949**	**0.0000**	**265.3135**	**265.3135**	**0.0586**	**0.0000**	**266.5439**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/4/2016	4/1/2016	5	65	
2	Pile Driving	Trenching	4/2/2016	4/29/2016	5	20	
3	Float installation	Building Construction	4/30/2016	5/27/2016	5	20	
4	Excavation/rock slope protection	Grading	5/28/2016	6/3/2016	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Cranes	1	8.00	226	0.29
Demolition	Other Construction Equipment	1	8.00	350	0.42
Demolition	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Other Material Handling Equipment	1	8.00	400	0.40
Demolition	Rubber Tired Dozers	0	1.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Pile Driving	Cranes	1	8.00	226	0.29
Pile Driving	Other Construction Equipment	1	8.00	350	0.42
Pile Driving	Other General Industrial Equipment	1	8.00	400	0.34
Pile Driving	Other Material Handling Equipment	1	8.00	400	0.40
Float installation	Air Compressors	1	8.00	78	0.48
Float installation	Cranes	1	8.00	226	0.29
Float installation	Forklifts	0	6.00	89	0.20
Float installation	Generator Sets	1	8.00	84	0.74
Float installation	Other General Industrial Equipment	1	8.00	87	0.34
Float installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Excavation/rock slope protection	Concrete/Industrial Saws	0	8.00	81	0.73
Excavation/rock slope protection	Excavators	1	8.00	162	0.38
Excavation/rock slope protection	Other General Industrial Equipment	1	8.00	400	0.34
Excavation/rock slope protection	Rubber Tired Dozers	1	8.00	255	0.40
Excavation/rock slope protection	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	10.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Pile Driving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Float installation	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/rock slope protection	3	8.00	0.00	1,875.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1300e-003	0.0000	1.1300e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1056	1.3171	0.6456	1.4200e-003		0.0519	0.0519		0.0478	0.0478	0.0000	134.0619	134.0619	0.0404	0.0000	134.9111
Total	**0.1056**	**1.3171**	**0.6456**	**1.4200e-003**	**1.1300e-003**	**0.0519**	**0.0531**	**1.7000e-004**	**0.0478**	**0.0480**	**0.0000**	**134.0619**	**134.0619**	**0.0404**	**0.0000**	**134.9111**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.3300e-003	1.4000e-003	0.0000	8.0000e-005	2.0000e-005	1.0000e-004	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3394	0.3394	0.0000	0.0000	0.3395
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2100e-003	1.5400e-003	0.0155	3.0000e-005	2.5700e-003	2.0000e-005	2.5900e-003	6.8000e-004	2.0000e-005	7.0000e-004	0.0000	2.3068	2.3068	1.3000e-004	0.0000	2.3095
Total	**1.3300e-003**	**2.8700e-003**	**0.0169**	**3.0000e-005**	**2.6500e-003**	**4.0000e-005**	**2.6900e-003**	**7.0000e-004**	**4.0000e-005**	**7.4000e-004**	**0.0000**	**2.6462**	**2.6462**	**1.3000e-004**	**0.0000**	**2.6489**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					1.1300e-003	0.0000	1.1300e-003	1.7000e-004	0.0000	1.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1056	1.3171	0.6456	1.4200e-003		0.0519	0.0519		0.0478	0.0478	0.0000	134.0618	134.0618	0.0404	0.0000	134.9110
Total	**0.1056**	**1.3171**	**0.6456**	**1.4200e-003**	**1.1300e-003**	**0.0519**	**0.0531**	**1.7000e-004**	**0.0478**	**0.0480**	**0.0000**	**134.0618**	**134.0618**	**0.0404**	**0.0000**	**134.9110**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	1.2000e-004	1.3300e-003	1.4000e-003	0.0000	8.0000e-005	2.0000e-005	1.0000e-004	2.0000e-005	2.0000e-005	4.0000e-005	0.0000	0.3394	0.3394	0.0000	0.0000	0.3395
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	1.2100e-003	1.5400e-003	0.0155	3.0000e-005	2.5700e-003	2.0000e-005	2.5900e-003	6.8000e-004	2.0000e-005	7.0000e-004	0.0000	2.3068	2.3068	1.3000e-004	0.0000	2.3095
Total	**1.3300e-003**	**2.8700e-003**	**0.0169**	**3.0000e-005**	**2.6500e-003**	**4.0000e-005**	**2.6900e-003**	**7.0000e-004**	**4.0000e-005**	**7.4000e-004**	**0.0000**	**2.6462**	**2.6462**	**1.3000e-004**	**0.0000**	**2.6489**

3.3 Pile Driving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0325	0.4053	0.1986	4.4000e-004		0.0160	0.0160		0.0147	0.0147	0.0000	41.2498	41.2498	0.0124	0.0000	41.5111
Total	**0.0325**	**0.4053**	**0.1986**	**4.4000e-004**		**0.0160**	**0.0160**		**0.0147**	**0.0147**	**0.0000**	**41.2498**	**41.2498**	**0.0124**	**0.0000**	**41.5111**

3.3 Pile Driving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	4.7000e-004	4.7600e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7098	0.7098	4.0000e-005	0.0000	0.7106
Total	**3.7000e-004**	**4.7000e-004**	**4.7600e-003**	**1.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7098**	**0.7098**	**4.0000e-005**	**0.0000**	**0.7106**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0325	0.4053	0.1986	4.4000e-004		0.0160	0.0160		0.0147	0.0147	0.0000	41.2498	41.2498	0.0124	0.0000	41.5111
Total	**0.0325**	**0.4053**	**0.1986**	**4.4000e-004**		**0.0160**	**0.0160**		**0.0147**	**0.0147**	**0.0000**	**41.2498**	**41.2498**	**0.0124**	**0.0000**	**41.5111**

3.3 Pile Driving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	4.7000e-004	4.7600e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7098	0.7098	4.0000e-005	0.0000	0.7106
Total	**3.7000e-004**	**4.7000e-004**	**4.7600e-003**	**1.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7098**	**0.7098**	**4.0000e-005**	**0.0000**	**0.7106**

3.4 Float installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0222	0.1974	0.1141	1.9000e-004		0.0126	0.0126		0.0121	0.0121	0.0000	16.7597	16.7597	3.2400e-003	0.0000	16.8278
Total	**0.0222**	**0.1974**	**0.1141**	**1.9000e-004**		**0.0126**	**0.0126**		**0.0121**	**0.0121**	**0.0000**	**16.7597**	**16.7597**	**3.2400e-003**	**0.0000**	**16.8278**

3.4 Float installation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0222	0.1974	0.1141	1.9000e-004		0.0126	0.0126		0.0121	0.0121	0.0000	16.7597	16.7597	3.2400e-003	0.0000	16.8278
Total	**0.0222**	**0.1974**	**0.1141**	**1.9000e-004**		**0.0126**	**0.0126**		**0.0121**	**0.0121**	**0.0000**	**16.7597**	**16.7597**	**3.2400e-003**	**0.0000**	**16.8278**

3.4 Float installation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.5 Excavation/rock slope protection - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0166	0.0000	0.0166	8.5100e-003	0.0000	8.5100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1200e-003	0.0706	0.0490	6.0000e-005		3.1100e-003	3.1100e-003		2.8600e-003	2.8600e-003	0.0000	6.1000	6.1000	1.8400e-003	0.0000	6.1387
Total	**6.1200e-003**	**0.0706**	**0.0490**	**6.0000e-005**	**0.0166**	**3.1100e-003**	**0.0197**	**8.5100e-003**	**2.8600e-003**	**0.0114**	**0.0000**	**6.1000**	**6.1000**	**1.8400e-003**	**0.0000**	**6.1387**

3.5 Excavation/rock slope protection - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0230	0.2491	0.2623	7.0000e-004	0.0158	3.7700e-003	0.0196	4.3400e-003	3.4600e-003	7.8100e-003	0.0000	63.6443	63.6443	4.5000e-004	0.0000	63.6538
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	9.0000e-005	9.5000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1420	0.1420	1.0000e-005	0.0000	0.1421
Total	**0.0231**	**0.2492**	**0.2632**	**7.0000e-004**	**0.0160**	**3.7700e-003**	**0.0197**	**4.3800e-003**	**3.4600e-003**	**7.8500e-003**	**0.0000**	**63.7862**	**63.7862**	**4.6000e-004**	**0.0000**	**63.7959**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0166	0.0000	0.0166	8.5100e-003	0.0000	8.5100e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	6.1200e-003	0.0706	0.0490	6.0000e-005		3.1100e-003	3.1100e-003		2.8600e-003	2.8600e-003	0.0000	6.1000	6.1000	1.8400e-003	0.0000	6.1387
Total	**6.1200e-003**	**0.0706**	**0.0490**	**6.0000e-005**	**0.0166**	**3.1100e-003**	**0.0197**	**8.5100e-003**	**2.8600e-003**	**0.0114**	**0.0000**	**6.1000**	**6.1000**	**1.8400e-003**	**0.0000**	**6.1387**

3.5 Excavation/rock slope protection - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0230	0.2491	0.2623	7.0000e-004	0.0158	3.7700e-003	0.0196	4.3400e-003	3.4600e-003	7.8100e-003	0.0000	63.6443	63.6443	4.5000e-004	0.0000	63.6538
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	7.0000e-005	9.0000e-005	9.5000e-004	0.0000	1.6000e-004	0.0000	1.6000e-004	4.0000e-005	0.0000	4.0000e-005	0.0000	0.1420	0.1420	1.0000e-005	0.0000	0.1421
Total	**0.0231**	**0.2492**	**0.2632**	**7.0000e-004**	**0.0160**	**3.7700e-003**	**0.0197**	**4.3800e-003**	**3.4600e-003**	**7.8500e-003**	**0.0000**	**63.7862**	**63.7862**	**4.6000e-004**	**0.0000**	**63.7959**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Rio Vista In Channel Work

Sacramento Valley Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	65
Climate Zone	4			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined land use to represent marina work in channel at Rio Vista. This run is for construction only.

Construction Phase - Construction schedule from Moffatt & Nichol. Conservatively assume 2016 dates.

Off-road Equipment - Tug represented as other material with hp 400, pile driving 350 hp other construction, work skiff other general industrial 400 hp

Off-road Equipment - General industrial = work skiff 400 hp

Off-road Equipment - Other general industrial= work skiff 400 hp

Off-road Equipment - Other construction = pile driver 350 hp
Other material = tug 400 hp
Other general industrial = skiff 400 hp

Demolition -

Grading -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	65.00
tblConstructionPhase	NumDays	0.00	5.00
tblGrading	MaterialExported	0.00	13,000.00
tblGrading	MaterialImported	0.00	2,000.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	10.9761	122.4424	110.8951	0.3058	13.2501	2.7496	15.9997	5.2137	2.5285	7.7422	0.0000	30,848.8821	30,848.8821	1.3759	0.0000	30,877.7765
Total	**10.9761**	**122.4424**	**110.8951**	**0.3058**	**13.2501**	**2.7496**	**15.9997**	**5.2137**	**2.5285**	**7.7422**	**0.0000**	**30,848.8821**	**30,848.8821**	**1.3759**	**0.0000**	**30,877.7765**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	10.9761	122.4424	110.8951	0.3058	13.2501	2.7496	15.9997	5.2137	2.5285	7.7422	0.0000	30,848.8821	30,848.8821	1.3759	0.0000	30,877.7765
Total	**10.9761**	**122.4424**	**110.8951**	**0.3058**	**13.2501**	**2.7496**	**15.9997**	**5.2137**	**2.5285**	**7.7422**	**0.0000**	**30,848.8821**	**30,848.8821**	**1.3759**	**0.0000**	**30,877.7765**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/4/2016	4/1/2016	5	65	
2	Pile Driving	Trenching	4/2/2016	4/29/2016	5	20	
3	Float installation	Building Construction	4/30/2016	5/27/2016	5	20	
4	Excavation/rock slope protection	Grading	5/28/2016	6/3/2016	5	5	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Cranes	1	8.00	226	0.29
Demolition	Other Construction Equipment	1	8.00	350	0.42
Demolition	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Other Material Handling Equipment	1	8.00	400	0.40
Demolition	Rubber Tired Dozers	0	1.00	255	0.40
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Pile Driving	Cranes	1	8.00	226	0.29
Pile Driving	Other Construction Equipment	1	8.00	350	0.42
Pile Driving	Other General Industrial Equipment	1	8.00	400	0.34
Pile Driving	Other Material Handling Equipment	1	8.00	400	0.40
Float installation	Air Compressors	1	8.00	78	0.48
Float installation	Cranes	1	8.00	226	0.29
Float installation	Forklifts	0	6.00	89	0.20
Float installation	Generator Sets	1	8.00	84	0.74
Float installation	Other General Industrial Equipment	1	8.00	87	0.34
Float installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Excavation/rock slope protection	Concrete/Industrial Saws	0	8.00	81	0.73
Excavation/rock slope protection	Excavators	1	8.00	162	0.38
Excavation/rock slope protection	Other General Industrial Equipment	1	8.00	400	0.34
Excavation/rock slope protection	Rubber Tired Dozers	1	8.00	255	0.40
Excavation/rock slope protection	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	10.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Pile Driving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Float installation	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/rock slope protection	3	8.00	0.00	1,875.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0347	0.0000	0.0347	5.2600e-003	0.0000	5.2600e-003			0.0000			0.0000
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704		4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**	**0.0347**	**1.5983**	**1.6330**	**5.2600e-003**	**1.4704**	**1.4757**		**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4800e-003	0.0386	0.0373	1.1000e-004	2.6800e-003	6.2000e-004	3.3000e-003	7.4000e-004	5.7000e-004	1.3000e-003		11.5242	11.5242	8.0000e-005		11.5259
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0476**	**0.0811**	**0.5827**	**1.1600e-003**	**0.0848**	**1.2400e-003**	**0.0861**	**0.0225**	**1.1300e-003**	**0.0237**		**97.9026**	**97.9026**	**4.3800e-003**		**97.9946**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0347	0.0000	0.0347	5.2600e-003	0.0000	5.2600e-003			0.0000			0.0000
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704	0.0000	4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**	**0.0347**	**1.5983**	**1.6330**	**5.2600e-003**	**1.4704**	**1.4757**	**0.0000**	**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	3.4800e-003	0.0386	0.0373	1.1000e-004	2.6800e-003	6.2000e-004	3.3000e-003	7.4000e-004	5.7000e-004	1.3000e-003		11.5242	11.5242	8.0000e-005		11.5259
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0476**	**0.0811**	**0.5827**	**1.1600e-003**	**0.0848**	**1.2400e-003**	**0.0861**	**0.0225**	**1.1300e-003**	**0.0237**		**97.9026**	**97.9026**	**4.3800e-003**		**97.9946**

3.3 Pile Driving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704		4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**		**1.5983**	**1.5983**		**1.4704**	**1.4704**		**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

3.3 Pile Driving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0442**	**0.0425**	**0.5454**	**1.0500e-003**	**0.0822**	**6.2000e-004**	**0.0828**	**0.0218**	**5.6000e-004**	**0.0224**		**86.3784**	**86.3784**	**4.3000e-003**		**86.4688**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704	0.0000	4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**		**1.5983**	**1.5983**		**1.4704**	**1.4704**	**0.0000**	**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

3.3 Pile Driving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0442**	**0.0425**	**0.5454**	**1.0500e-003**	**0.0822**	**6.2000e-004**	**0.0828**	**0.0218**	**5.6000e-004**	**0.0224**		**86.3784**	**86.3784**	**4.3000e-003**		**86.4688**

3.4 Float installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2237	19.7347	11.4103	0.0187		1.2582	1.2582		1.2056	1.2056		1,847.4420	1,847.4420	0.3574		1,854.9471
Total	**2.2237**	**19.7347**	**11.4103**	**0.0187**		**1.2582**	**1.2582**		**1.2056**	**1.2056**		**1,847.4420**	**1,847.4420**	**0.3574**		**1,854.9471**

3.4 Float installation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2237	19.7347	11.4103	0.0187		1.2582	1.2582		1.2056	1.2056	0.0000	1,847.442 0	1,847.442 0	0.3574		1,854.947 1
Total	**2.2237**	**19.7347**	**11.4103**	**0.0187**		**1.2582**	**1.2582**		**1.2056**	**1.2056**	**0.0000**	**1,847.442 0**	**1,847.442 0**	**0.3574**		**1,854.947 1**

3.4 Float installation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.5 Excavation/rock slope protection - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6425	0.0000	6.6425	3.4042	0.0000	3.4042			0.0000			0.0000
Off-Road	2.4468	28.2550	19.5898	0.0259		1.2446	1.2446		1.1450	1.1450		2,689.659 1	2,689.659 1	0.8113		2,706.696 3
Total	**2.4468**	**28.2550**	**19.5898**	**0.0259**	**6.6425**	**1.2446**	**7.8871**	**3.4042**	**1.1450**	**4.5492**		**2,689.659 1**	**2,689.659 1**	**0.8113**		**2,706.696 3**

3.5 Excavation/rock slope protection - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.4940	94.1534	90.8690	0.2790	6.5419	1.5045	8.0464	1.7921	1.3831	3.1751		28,090.1203	28,090.1203	0.1987		28,094.2927
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0353	0.0340	0.4363	8.4000e-004	0.0657	4.9000e-004	0.0662	0.0174	4.5000e-004	0.0179		69.1027	69.1027	3.4400e-003		69.1750
Total	**8.5293**	**94.1874**	**91.3053**	**0.2799**	**6.6076**	**1.5050**	**8.1126**	**1.8095**	**1.3835**	**3.1930**		**28,159.2230**	**28,159.2230**	**0.2021**		**28,163.4677**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.6425	0.0000	6.6425	3.4042	0.0000	3.4042			0.0000			0.0000
Off-Road	2.4468	28.2550	19.5898	0.0259		1.2446	1.2446		1.1450	1.1450	0.0000	2,689.6591	2,689.6591	0.8113		2,706.6963
Total	**2.4468**	**28.2550**	**19.5898**	**0.0259**	**6.6425**	**1.2446**	**7.8871**	**3.4042**	**1.1450**	**4.5492**	**0.0000**	**2,689.6591**	**2,689.6591**	**0.8113**		**2,706.6963**

3.5 Excavation/rock slope protection - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	8.4940	94.1534	90.8690	0.2790	6.5419	1.5045	8.0464	1.7921	1.3831	3.1751		28,090.1203	28,090.1203	0.1987		28,094.2927
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0353	0.0340	0.4363	8.4000e-004	0.0657	4.9000e-004	0.0662	0.0174	4.5000e-004	0.0179		69.1027	69.1027	3.4400e-003		69.1750
Total	**8.5293**	**94.1874**	**91.3053**	**0.2799**	**6.6076**	**1.5050**	**8.1126**	**1.8095**	**1.3835**	**3.1930**		**28,159.2230**	**28,159.2230**	**0.2021**		**28,163.4677**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Delta Research Station Alt 3

Sacramento Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	2.50	1000sqft	0.06	2,500.00	0
Research & Development	66.50	1000sqft	1.53	66,500.00	0
Research & Development	39.50	1000sqft	0.91	39,500.00	0
General Heavy Industry	6.00	1000sqft	0.14	6,000.00	0
General Light Industry	15.00	1000sqft	0.34	15,000.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	294.00	Space	2.65	117,600.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 3.5 **Precipitation Freq (Days)** 65

Climate Zone 4 **Operational Year** 2017

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Grading -

Demolition -

Vehicle Trips - Allocated trips to R&D 797 trips/106 sqft=7.52 trips Monday through Saturday.

Operational Off-Road Equipment - Added a forklift

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	58,110.00
tblGrading	MaterialImported	0.00	58,110.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.20	0.20
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	7.52
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	68.93	0.00
tblVehicleTrips	WD_TR	8.11	7.52
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.7709	6.6527	6.3353	0.0118	0.4440	0.3059	0.7499	0.1594	0.2857	0.4451	0.0000	1,052.1371	1,052.1371	0.0973	0.0000	1,054.1805
2017	2.5118	0.5241	0.4770	7.8000e-004	0.0158	0.0308	0.0466	4.2800e-003	0.0288	0.0331	0.0000	67.5112	67.5112	0.0129	0.0000	67.7812
Total	**3.2827**	**7.1768**	**6.8123**	**0.0126**	**0.4598**	**0.3367**	**0.7965**	**0.1637**	**0.3145**	**0.4782**	**0.0000**	**1,119.6484**	**1,119.6484**	**0.1102**	**0.0000**	**1,121.9617**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.7709	6.6527	6.3353	0.0118	0.4440	0.3059	0.7499	0.1594	0.2857	0.4451	0.0000	1,052.1367	1,052.1367	0.0973	0.0000	1,054.1801
2017	2.5118	0.5241	0.4770	7.8000e-004	0.0158	0.0308	0.0466	4.2800e-003	0.0288	0.0331	0.0000	67.5112	67.5112	0.0129	0.0000	67.7811
Total	**3.2827**	**7.1768**	**6.8123**	**0.0126**	**0.4598**	**0.3367**	**0.7965**	**0.1637**	**0.3145**	**0.4782**	**0.0000**	**1,119.6479**	**1,119.6479**	**0.1102**	**0.0000**	**1,121.9612**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.5147	4.0000e-005	4.7000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.9600e-003	8.9600e-003	2.0000e-005	0.0000	9.4900e-003
Energy	0.0205	0.1867	0.1568	1.1200e-003		0.0142	0.0142		0.0142	0.0142	0.0000	668.6745	668.6745	0.0249	8.0800e-003	671.7032
Mobile	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430
Offroad	0.0276	0.2386	0.1632	2.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	18.5199	18.5199	5.6700e-003	0.0000	18.6391
Waste						0.0000	0.0000		0.0000	0.0000	22.2783	0.0000	22.2783	1.3166	0.0000	49.9270
Water						0.0000	0.0000		0.0000	0.0000	23.9558	119.1718	143.1276	2.4659	0.0592	213.2670
Total	**2.0546**	**1.7472**	**5.5156**	**0.0112**	**0.6377**	**0.0510**	**0.6887**	**0.1711**	**0.0480**	**0.2192**	**46.2341**	**1,575.6771**	**1,621.9112**	**3.8437**	**0.0673**	**1,723.4888**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.5147	4.0000e-005	4.7000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.9600e-003	8.9600e-003	2.0000e-005	0.0000	9.4900e-003
Energy	0.0205	0.1867	0.1568	1.1200e-003		0.0142	0.0142		0.0142	0.0142	0.0000	668.6745	668.6745	0.0249	8.0800e-003	671.7032
Mobile	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430
Offroad	0.0276	0.2386	0.1632	2.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	18.5199	18.5199	5.6700e-003	0.0000	18.6391
Waste						0.0000	0.0000		0.0000	0.0000	22.2783	0.0000	22.2783	1.3166	0.0000	49.9270
Water						0.0000	0.0000		0.0000	0.0000	23.9558	119.1718	143.1276	2.4654	0.0591	213.2288
Total	**2.0546**	**1.7472**	**5.5156**	**0.0112**	**0.6377**	**0.0510**	**0.6887**	**0.1711**	**0.0480**	**0.2192**	**46.2341**	**1,575.6771**	**1,621.9112**	**3.8432**	**0.0672**	**1,723.4506**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	1.34	13.66	2.96	1.78	0.00	38.62	2.86	0.00	37.71	8.26	0.00	1.18	1.14	0.16	0.13	1.08

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/10/2016	5	20	
4	Building Construction	Building Construction	3/11/2016	1/26/2017	5	230	
5	Paving	Paving	1/27/2017	2/23/2017	5	20	
6	Architectural Coating	Architectural Coating	2/24/2017	3/23/2017	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 316,542; Non-Residential Outdoor: 105,514 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	80.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	14,528.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	126.00	53.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	25.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.0600e-003	0.0000	9.0600e-003	1.3700e-003	0.0000	1.3700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0974	37.0974	0.0101	0.0000	37.3092
Total	**0.0429**	**0.4566**	**0.3503**	**4.0000e-004**	**9.0600e-003**	**0.0229**	**0.0320**	**1.3700e-003**	**0.0214**	**0.0227**	**0.0000**	**37.0974**	**37.0974**	**0.0101**	**0.0000**	**37.3092**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.8000e-004	0.0106	0.0112	3.0000e-005	6.7000e-004	1.6000e-004	8.3000e-004	1.9000e-004	1.5000e-004	3.3000e-004	0.0000	2.7155	2.7155	2.0000e-005	0.0000	2.7159
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**1.5400e-003**	**0.0113**	**0.0183**	**4.0000e-005**	**1.8500e-003**	**1.7000e-004**	**2.0200e-003**	**5.1000e-004**	**1.6000e-004**	**6.5000e-004**	**0.0000**	**3.7802**	**3.7802**	**8.0000e-005**	**0.0000**	**3.7818**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					9.0600e-003	0.0000	9.0600e-003	1.3700e-003	0.0000	1.3700e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0973	37.0973	0.0101	0.0000	37.3092
Total	**0.0429**	**0.4566**	**0.3503**	**4.0000e-004**	**9.0600e-003**	**0.0229**	**0.0320**	**1.3700e-003**	**0.0214**	**0.0227**	**0.0000**	**37.0973**	**37.0973**	**0.0101**	**0.0000**	**37.3092**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	9.8000e-004	0.0106	0.0112	3.0000e-005	6.7000e-004	1.6000e-004	8.3000e-004	1.9000e-004	1.5000e-004	3.3000e-004	0.0000	2.7155	2.7155	2.0000e-005	0.0000	2.7159
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**1.5400e-003**	**0.0113**	**0.0183**	**4.0000e-005**	**1.8500e-003**	**1.7000e-004**	**2.0200e-003**	**5.1000e-004**	**1.6000e-004**	**6.5000e-004**	**0.0000**	**3.7802**	**3.7802**	**8.0000e-005**	**0.0000**	**3.7818**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4386	18.4386	5.5600e-003	0.0000	18.5554
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.0903**	**0.0147**	**0.1050**	**0.0497**	**0.0135**	**0.0632**	**0.0000**	**18.4386**	**18.4386**	**5.5600e-003**	**0.0000**	**18.5554**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	4.3000e-004	4.2800e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6388	0.6388	4.0000e-005	0.0000	0.6395
Total	**3.3000e-004**	**4.3000e-004**	**4.2800e-003**	**1.0000e-005**	**7.1000e-004**	**1.0000e-005**	**7.2000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.6388**	**0.6388**	**4.0000e-005**	**0.0000**	**0.6395**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4385	18.4385	5.5600e-003	0.0000	18.5553
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.0903**	**0.0147**	**0.1050**	**0.0497**	**0.0135**	**0.0632**	**0.0000**	**18.4385**	**18.4385**	**5.5600e-003**	**0.0000**	**18.5553**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.3000e-004	4.3000e-004	4.2800e-003	1.0000e-005	7.1000e-004	1.0000e-005	7.2000e-004	1.9000e-004	1.0000e-005	1.9000e-004	0.0000	0.6388	0.6388	4.0000e-005	0.0000	0.6395
Total	**3.3000e-004**	**4.3000e-004**	**4.2800e-003**	**1.0000e-005**	**7.1000e-004**	**1.0000e-005**	**7.2000e-004**	**1.9000e-004**	**1.0000e-005**	**1.9000e-004**	**0.0000**	**0.6388**	**0.6388**	**4.0000e-005**	**0.0000**	**0.6395**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0775	0.0000	0.0775	0.0355	0.0000	0.0355	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0367	0.3845	0.2608	3.0000e-004		0.0220	0.0220		0.0202	0.0202	0.0000	28.0664	28.0664	8.4700e-003	0.0000	28.2442
Total	**0.0367**	**0.3845**	**0.2608**	**3.0000e-004**	**0.0775**	**0.0220**	**0.0995**	**0.0355**	**0.0202**	**0.0557**	**0.0000**	**28.0664**	**28.0664**	**8.4700e-003**	**0.0000**	**28.2442**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1784	1.9299	2.0323	5.4000e-003	0.1225	0.0292	0.1516	0.0337	0.0268	0.0605	0.0000	493.1328	493.1328	3.5100e-003	0.0000	493.2065
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**0.1790**	**1.9306**	**2.0394**	**5.4100e-003**	**0.1236**	**0.0292**	**0.1528**	**0.0340**	**0.0268**	**0.0608**	**0.0000**	**494.1974**	**494.1974**	**3.5700e-003**	**0.0000**	**494.2724**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0775	0.0000	0.0775	0.0355	0.0000	0.0355	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0367	0.3845	0.2608	3.0000e-004		0.0220	0.0220		0.0202	0.0202	0.0000	28.0664	28.0664	8.4700e-003	0.0000	28.2441
Total	**0.0367**	**0.3845**	**0.2608**	**3.0000e-004**	**0.0775**	**0.0220**	**0.0995**	**0.0355**	**0.0202**	**0.0557**	**0.0000**	**28.0664**	**28.0664**	**8.4700e-003**	**0.0000**	**28.2441**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1784	1.9299	2.0323	5.4000e-003	0.1225	0.0292	0.1516	0.0337	0.0268	0.0605	0.0000	493.1328	493.1328	3.5100e-003	0.0000	493.2065
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**0.1790**	**1.9306**	**2.0394**	**5.4100e-003**	**0.1236**	**0.0292**	**0.1528**	**0.0340**	**0.0268**	**0.0608**	**0.0000**	**494.1974**	**494.1974**	**3.5700e-003**	**0.0000**	**494.2724**

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3594	3.0074	1.9525	2.8300e-003		0.2076	0.2076		0.1950	0.1950	0.0000	255.4720	255.4720	0.0634	0.0000	256.8026
Total	**0.3594**	**3.0074**	**1.9525**	**2.8300e-003**		**0.2076**	**0.2076**		**0.1950**	**0.1950**	**0.0000**	**255.4720**	**255.4720**	**0.0634**	**0.0000**	**256.8026**

3.5 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0765	0.5258	0.8715	1.3200e-003	0.0359	8.5700e-003	0.0445	0.0103	7.8700e-003	0.0182	0.0000	120.0951	120.0951	9.5000e-004	0.0000	120.1151
Worker	0.0493	0.0630	0.6327	1.2600e-003	0.1050	8.2000e-004	0.1058	0.0279	7.5000e-004	0.0287	0.0000	94.3513	94.3513	5.1900e-003	0.0000	94.4602
Total	**0.1258**	**0.5888**	**1.5042**	**2.5800e-003**	**0.1409**	**9.3900e-003**	**0.1502**	**0.0382**	**8.6200e-003**	**0.0468**	**0.0000**	**214.4464**	**214.4464**	**6.1400e-003**	**0.0000**	**214.5754**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3594	3.0074	1.9525	2.8300e-003		0.2076	0.2076		0.1950	0.1950	0.0000	255.4717	255.4717	0.0634	0.0000	256.8023
Total	**0.3594**	**3.0074**	**1.9525**	**2.8300e-003**		**0.2076**	**0.2076**		**0.1950**	**0.1950**	**0.0000**	**255.4717**	**255.4717**	**0.0634**	**0.0000**	**256.8023**

3.5 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0765	0.5258	0.8715	1.3200e-003	0.0359	8.5700e-003	0.0445	0.0103	7.8700e-003	0.0182	0.0000	120.0951	120.0951	9.5000e-004	0.0000	120.1151
Worker	0.0493	0.0630	0.6327	1.2600e-003	0.1050	8.2000e-004	0.1058	0.0279	7.5000e-004	0.0287	0.0000	94.3513	94.3513	5.1900e-003	0.0000	94.4602
Total	**0.1258**	**0.5888**	**1.5042**	**2.5800e-003**	**0.1409**	**9.3900e-003**	**0.1502**	**0.0382**	**8.6200e-003**	**0.0468**	**0.0000**	**214.4464**	**214.4464**	**6.1400e-003**	**0.0000**	**214.5754**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0295	0.2509	0.1722	2.5000e-004		0.0169	0.0169		0.0159	0.0159	0.0000	22.7505	22.7505	5.6000e-003	0.0000	22.8681
Total	**0.0295**	**0.2509**	**0.1722**	**2.5000e-004**		**0.0169**	**0.0169**		**0.0159**	**0.0159**	**0.0000**	**22.7505**	**22.7505**	**5.6000e-003**	**0.0000**	**22.8681**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9800e-003	0.0417	0.0719	1.2000e-004	3.2300e-003	6.5000e-004	3.8800e-003	9.3000e-004	6.0000e-004	1.5200e-003	0.0000	10.6290	10.6290	8.0000e-005	0.0000	10.6306
Worker	3.8600e-003	5.0200e-003	0.0501	1.1000e-004	9.4500e-003	7.0000e-005	9.5200e-003	2.5100e-003	6.0000e-005	2.5800e-003	0.0000	8.1587	8.1587	4.2000e-004	0.0000	8.1676
Total	**9.8400e-003**	**0.0467**	**0.1221**	**2.3000e-004**	**0.0127**	**7.2000e-004**	**0.0134**	**3.4400e-003**	**6.6000e-004**	**4.1000e-003**	**0.0000**	**18.7877**	**18.7877**	**5.0000e-004**	**0.0000**	**18.7982**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0295	0.2509	0.1722	2.5000e-004		0.0169	0.0169		0.0159	0.0159	0.0000	22.7505	22.7505	5.6000e-003	0.0000	22.8681
Total	**0.0295**	**0.2509**	**0.1722**	**2.5000e-004**		**0.0169**	**0.0169**		**0.0159**	**0.0159**	**0.0000**	**22.7505**	**22.7505**	**5.6000e-003**	**0.0000**	**22.8681**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	5.9800e-003	0.0417	0.0719	1.2000e-004	3.2300e-003	6.5000e-004	3.8800e-003	9.3000e-004	6.0000e-004	1.5200e-003	0.0000	10.6290	10.6290	8.0000e-005	0.0000	10.6306
Worker	3.8600e-003	5.0200e-003	0.0501	1.1000e-004	9.4500e-003	7.0000e-005	9.5200e-003	2.5100e-003	6.0000e-005	2.5800e-003	0.0000	8.1587	8.1587	4.2000e-004	0.0000	8.1676
Total	**9.8400e-003**	**0.0467**	**0.1221**	**2.3000e-004**	**0.0127**	**7.2000e-004**	**0.0134**	**3.4400e-003**	**6.6000e-004**	**4.1000e-003**	**0.0000**	**18.7877**	**18.7877**	**5.0000e-004**	**0.0000**	**18.7982**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266
Paving	3.4700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0225**	**0.2030**	**0.1473**	**2.2000e-004**		**0.0114**	**0.0114**		**0.0105**	**0.0105**	**0.0000**	**20.6934**	**20.6934**	**6.3400e-003**	**0.0000**	**20.8266**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	6.3000e-004	6.2800e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0224	1.0224	5.0000e-005	0.0000	1.0235
Total	**4.8000e-004**	**6.3000e-004**	**6.2800e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1900e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0224**	**1.0224**	**5.0000e-005**	**0.0000**	**1.0235**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265
Paving	3.4700e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0225**	**0.2030**	**0.1473**	**2.2000e-004**		**0.0114**	**0.0114**		**0.0105**	**0.0105**	**0.0000**	**20.6934**	**20.6934**	**6.3400e-003**	**0.0000**	**20.8265**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	4.8000e-004	6.3000e-004	6.2800e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0224	1.0224	5.0000e-005	0.0000	1.0235
Total	**4.8000e-004**	**6.3000e-004**	**6.2800e-003**	**1.0000e-005**	**1.1800e-003**	**1.0000e-005**	**1.1900e-003**	**3.2000e-004**	**1.0000e-005**	**3.2000e-004**	**0.0000**	**1.0224**	**1.0224**	**5.0000e-005**	**0.0000**	**1.0235**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.4453					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3200e-003	0.0219	0.0187	3.0000e-005		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	2.5533	2.5533	2.7000e-004	0.0000	2.5589
Total	**2.4486**	**0.0219**	**0.0187**	**3.0000e-005**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**2.5533**	**2.5533**	**2.7000e-004**	**0.0000**	**2.5589**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.0500e-003	0.0105	2.0000e-005	1.9700e-003	1.0000e-005	1.9900e-003	5.3000e-004	1.0000e-005	5.4000e-004	0.0000	1.7040	1.7040	9.0000e-005	0.0000	1.7059
Total	**8.1000e-004**	**1.0500e-003**	**0.0105**	**2.0000e-005**	**1.9700e-003**	**1.0000e-005**	**1.9900e-003**	**5.3000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7040**	**1.7040**	**9.0000e-005**	**0.0000**	**1.7059**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	2.4453					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3200e-003	0.0219	0.0187	3.0000e-005		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	2.5533	2.5533	2.7000e-004	0.0000	2.5589
Total	**2.4486**	**0.0219**	**0.0187**	**3.0000e-005**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**2.5533**	**2.5533**	**2.7000e-004**	**0.0000**	**2.5589**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.1000e-004	1.0500e-003	0.0105	2.0000e-005	1.9700e-003	1.0000e-005	1.9900e-003	5.3000e-004	1.0000e-005	5.4000e-004	0.0000	1.7040	1.7040	9.0000e-005	0.0000	1.7059
Total	**8.1000e-004**	**1.0500e-003**	**0.0105**	**2.0000e-005**	**1.9700e-003**	**1.0000e-005**	**1.9900e-003**	**5.3000e-004**	**1.0000e-005**	**5.4000e-004**	**0.0000**	**1.7040**	**1.7040**	**9.0000e-005**	**0.0000**	**1.7059**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430
Unmitigated	0.4919	1.3218	5.1909	9.9200e-003	0.6377	0.0171	0.6548	0.1711	0.0157	0.1868	0.0000	769.3019	769.3019	0.0305	0.0000	769.9430

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Light Industry	0.00	0.00	0.00		
Government Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	500.08	500.08	0.00	1,074,278	1,074,278
Research & Development	297.04	297.04	0.00	638,105	638,105
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	797.12	797.12	0.00	1,712,383	1,712,383

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Government Office Building	9.50	7.30	7.30	33.00	62.00	5.00	50	34	16
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	465.4214	465.4214	0.0211	4.3500e-003	467.2131
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	465.4214	465.4214	0.0211	4.3500e-003	467.2131
NaturalGas Mitigated	0.0205	0.1867	0.1568	1.1200e-003		0.0142	0.0142		0.0142	0.0142	0.0000	203.2531	203.2531	3.9000e-003	3.7300e-003	204.4901
NaturalGas Unmitigated	0.0205	0.1867	0.1568	1.1200e-003		0.0142	0.0142		0.0142	0.0142	0.0000	203.2531	203.2531	3.9000e-003	3.7300e-003	204.4901

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	411150	2.2200e-003	0.0202	0.0169	1.2000e-004		1.5300e-003	1.5300e-003		1.5300e-003	1.5300e-003	0.0000	21.9405	21.9405	4.2000e-004	4.0000e-004	22.0741
Government Office Building	43050	2.3000e-004	2.1100e-003	1.7700e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.2973	2.2973	4.0000e-005	4.0000e-005	2.3113
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.08269e+006	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0300e-003	4.0300e-003		4.0300e-003	4.0300e-003	0.0000	57.7767	57.7767	1.1100e-003	1.0600e-003	58.1284
Research & Development	1.82276e+006	9.8300e-003	0.0894	0.0751	5.4000e-004		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	97.2697	97.2697	1.8600e-003	1.7800e-003	97.8617
Unrefrigerated Warehouse-No Rail	219000	1.1800e-003	0.0107	9.0200e-003	6.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	11.6867	11.6867	2.2000e-004	2.1000e-004	11.7578
Unrefrigerated Warehouse-No Rail	65700	3.5000e-004	3.2200e-003	2.7100e-003	2.0000e-005		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	3.5060	3.5060	7.0000e-005	6.0000e-005	3.5273
General Heavy Industry	164460	8.9000e-004	8.0600e-003	6.7700e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004	0.0000	8.7762	8.7762	1.7000e-004	1.6000e-004	8.8296
Total		**0.0205**	**0.1867**	**0.1568**	**1.1200e-003**		**0.0142**	**0.0142**		**0.0142**	**0.0142**	**0.0000**	**203.2531**	**203.2531**	**3.8900e-003**	**3.7100e-003**	**204.4901**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	411150	2.2200e-003	0.0202	0.0169	1.2000e-004		1.5300e-003	1.5300e-003		1.5300e-003	1.5300e-003	0.0000	21.9405	21.9405	4.2000e-004	4.0000e-004	22.0741
Government Office Building	43050	2.3000e-004	2.1100e-003	1.7700e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.2973	2.2973	4.0000e-005	4.0000e-005	2.3113
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.08269e+006	5.8400e-003	0.0531	0.0446	3.2000e-004		4.0300e-003	4.0300e-003		4.0300e-003	4.0300e-003	0.0000	57.7767	57.7767	1.1100e-003	1.0600e-003	58.1284
Research & Development	1.82276e+006	9.8300e-003	0.0894	0.0751	5.4000e-004		6.7900e-003	6.7900e-003		6.7900e-003	6.7900e-003	0.0000	97.2697	97.2697	1.8600e-003	1.7800e-003	97.8617
Unrefrigerated Warehouse-No Rail	219000	1.1800e-003	0.0107	9.0200e-003	6.0000e-005		8.2000e-004	8.2000e-004		8.2000e-004	8.2000e-004	0.0000	11.6867	11.6867	2.2000e-004	2.1000e-004	11.7578
Unrefrigerated Warehouse-No Rail	65700	3.5000e-004	3.2200e-003	2.7100e-003	2.0000e-005		2.4000e-004	2.4000e-004		2.4000e-004	2.4000e-004	0.0000	3.5060	3.5060	7.0000e-005	6.0000e-005	3.5273
General Heavy Industry	164460	8.9000e-004	8.0600e-003	6.7700e-003	5.0000e-005		6.1000e-004	6.1000e-004		6.1000e-004	6.1000e-004	0.0000	8.7762	8.7762	1.7000e-004	1.6000e-004	8.8296
Total		**0.0205**	**0.1867**	**0.1568**	**1.1200e-003**		**0.0142**	**0.0142**		**0.0142**	**0.0142**	**0.0000**	**203.2531**	**203.2531**	**3.8900e-003**	**3.7100e-003**	**204.4901**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	54180	15.7616	7.1000e-004	1.5000e-004	15.8223
General Light Industry	135450	39.4040	1.7800e-003	3.7000e-004	39.5557
Government Office Building	49275	14.3347	6.5000e-004	1.3000e-004	14.3899
Parking Lot	103488	30.1059	1.3600e-003	2.8000e-004	30.2217
Research & Development	356685	103.7638	4.6900e-003	9.7000e-004	104.1632
Research & Development	600495	174.6909	7.9000e-003	1.6300e-003	175.3634
Unrefrigerated Warehouse-No Rail	231000	67.2006	3.0400e-003	6.3000e-004	67.4593
Unrefrigerated Warehouse-No Rail	69300	20.1602	9.1000e-004	1.9000e-004	20.2378
Total		**465.4214**	**0.0210**	**4.3500e-003**	**467.2131**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	54180	15.7616	7.1000e-004	1.5000e-004	15.8223
General Light Industry	135450	39.4040	1.7800e-003	3.7000e-004	39.5557
Government Office Building	49275	14.3347	6.5000e-004	1.3000e-004	14.3899
Parking Lot	103488	30.1059	1.3600e-003	2.8000e-004	30.2217
Research & Development	356685	103.7638	4.6900e-003	9.7000e-004	104.1632
Research & Development	600495	174.6909	7.9000e-003	1.6300e-003	175.3634
Unrefrigerated Warehouse-No Rail	231000	67.2006	3.0400e-003	6.3000e-004	67.4593
Unrefrigerated Warehouse-No Rail	69300	20.1602	9.1000e-004	1.9000e-004	20.2378
Total		**465.4214**	**0.0210**	**4.3500e-003**	**467.2131**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.5147	4.0000e-005	4.7000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.9600e-003	8.9600e-003	2.0000e-005	0.0000	9.4900e-003
Unmitigated	1.5147	4.0000e-005	4.7000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.9600e-003	8.9600e-003	2.0000e-005	0.0000	9.4900e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2445					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.2697					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.5000e-004	4.0000e-005	4.7000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.9600e-003	8.9600e-003	2.0000e-005	0.0000	9.4900e-003
Total	**1.5147**	**4.0000e-005**	**4.7000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**8.9600e-003**	**8.9600e-003**	**2.0000e-005**	**0.0000**	**9.4900e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.2445					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.2697					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.5000e-004	4.0000e-005	4.7000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	8.9600e-003	8.9600e-003	2.0000e-005	0.0000	9.4900e-003
Total	**1.5147**	**4.0000e-005**	**4.7000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**8.9600e-003**	**8.9600e-003**	**2.0000e-005**	**0.0000**	**9.4900e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	143.1276	2.4654	0.0591	213.2288
Unmitigated	143.1276	2.4659	0.0592	213.2670

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	1.3875 / 0	2.6243	0.0453	1.0900e-003	3.9131
General Light Industry	3.46875 / 0	6.5607	0.1133	2.7200e-003	9.7827
Government Office Building	0.496649 / 0.304398	1.2493	0.0162	3.9000e-004	1.7118
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	52.1196 / 0	98.5777	1.7020	0.0409	146.9895
Unrefrigerated Warehouse-No Rail	18.0375 / 0	34.1157	0.5890	0.0141	50.8700
Total		**143.1276**	**2.4659**	**0.0592**	**213.2670**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	1.3875 / 0	2.6243	0.0453	1.0900e-003	3.9124
General Light Industry	3.46875 / 0	6.5607	0.1133	2.7200e-003	9.7809
Government Office Building	0.496649 / 0.304398	1.2493	0.0162	3.9000e-004	1.7115
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	52.1196 / 0	98.5777	1.7017	0.0408	146.9631
Unrefrigerated Warehouse-No Rail	18.0375 / 0	34.1157	0.5889	0.0141	50.8609
Total		**143.1276**	**2.4654**	**0.0591**	**213.2288**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	22.2783	1.3166	0.0000	49.9270
Unmitigated	22.2783	1.3166	0.0000	49.9270

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	7.44	1.5103	0.0893	0.0000	3.3846
General Light Industry	18.6	3.7756	0.2231	0.0000	8.4614
Government Office Building	2.33	0.4730	0.0280	0.0000	1.0600
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	8.06	1.6361	0.0967	0.0000	3.6666
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**22.2783**	**1.3166**	**0.0000**	**49.9270**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	7.44	1.5103	0.0893	0.0000	3.3846
General Light Industry	18.6	3.7756	0.2231	0.0000	8.4614
Government Office Building	2.33	0.4730	0.0280	0.0000	1.0600
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	8.06	1.6361	0.0967	0.0000	3.6666
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**22.2783**	**1.3166**	**0.0000**	**49.9270**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0276	0.2386	0.1632	2.0000e-004		0.0197	0.0197		0.0181	0.0181	0.0000	18.5199	18.5199	5.6700e-003	0.0000	18.6391
Total	**0.0276**	**0.2386**	**0.1632**	**2.0000e-004**		**0.0197**	**0.0197**		**0.0181**	**0.0181**	**0.0000**	**18.5199**	**18.5199**	**5.6700e-003**	**0.0000**	**18.6391**

10.0 Vegetation

Delta Research Station Alt 3

Sacramento Valley Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	2.50	1000sqft	0.06	2,500.00	0
Research & Development	66.50	1000sqft	1.53	66,500.00	0
Research & Development	39.50	1000sqft	0.91	39,500.00	0
General Heavy Industry	6.00	1000sqft	0.14	6,000.00	0
General Light Industry	15.00	1000sqft	0.34	15,000.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	294.00	Space	2.65	117,600.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	65
Climate Zone	4			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase -

Grading -

Demolition -

Vehicle Trips - Allocated trips to R&D 797 trips/106 sqft=7.52 trips Monday through Saturday.

Operational Off-Road Equipment - Added a forklift

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	58,110.00
tblGrading	MaterialImported	0.00	58,110.00
tblOperationalOffRoadEquipment	OperLoadFactor	0.20	0.20
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	7.52
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	68.93	0.00
tblVehicleTrips	WD_TR	8.11	7.52
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	20.1866	220.8918	202.9161	0.5718	20.5494	5.1137	25.6631	9.9699	4.7024	12.6745	0.0000	57,635.7922	57,635.7922	1.3245	0.0000	57,663.6071
2017	244.9578	31.0603	30.3814	0.0526	1.3866	1.8567	3.2433	0.3748	1.7423	2.1171	0.0000	4,922.4420	4,922.4420	0.7080	0.0000	4,937.3098
Total	**265.1444**	**251.9521**	**233.2975**	**0.6244**	**21.9360**	**6.9704**	**28.9064**	**10.3447**	**6.4448**	**14.7916**	**0.0000**	**62,558.2343**	**62,558.2343**	**2.0325**	**0.0000**	**62,600.9168**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	20.1866	220.8918	202.9161	0.5718	20.5494	5.1137	25.6631	9.9699	4.7024	12.6745	0.0000	57,635.7922	57,635.7922	1.3245	0.0000	57,663.6070
2017	244.9578	31.0603	30.3814	0.0526	1.3866	1.8567	3.2433	0.3748	1.7423	2.1171	0.0000	4,922.4420	4,922.4420	0.7080	0.0000	4,937.3097
Total	**265.1444**	**251.9521**	**233.2975**	**0.6244**	**21.9360**	**6.9704**	**28.9064**	**10.3447**	**6.4448**	**14.7916**	**0.0000**	**62,558.2343**	**62,558.2343**	**2.0325**	**0.0000**	**62,600.9168**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.3021	4.9000e-004	0.0522	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1098	0.1098	3.1000e-004		0.1162
Energy	0.1125	1.0231	0.8594	6.1400e-003		0.0778	0.0778		0.0778	0.0778		1,227.6616	1,227.6616	0.0235	0.0225	1,235.1329
Mobile	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.0325	5,819.0325	0.2159		5,823.5654
Offroad	0.2120	1.8355	1.2554	1.5300e-003		0.1514	0.1514		0.1393	0.1393		157.0360	157.0360	0.0481		158.0465
Total	**12.1170**	**10.7689**	**36.1317**	**0.0760**	**4.2495**	**0.3387**	**4.5882**	**1.1367**	**0.3178**	**1.4544**		**7,203.8398**	**7,203.8398**	**0.2878**	**0.0225**	**7,216.8610**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.3021	4.9000e-004	0.0522	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1098	0.1098	3.1000e-004		0.1162
Energy	0.1125	1.0231	0.8594	6.1400e-003		0.0778	0.0778		0.0778	0.0778		1,227.6616	1,227.6616	0.0235	0.0225	1,235.1329
Mobile	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.0325	5,819.0325	0.2159		5,823.5654
Offroad	0.2120	1.8355	1.2554	1.5300e-003		0.1514	0.1514		0.1393	0.1393		157.0360	157.0360	0.0481		158.0465
Total	**12.1170**	**10.7689**	**36.1317**	**0.0760**	**4.2495**	**0.3387**	**4.5882**	**1.1367**	**0.3178**	**1.4544**		**7,203.8398**	**7,203.8398**	**0.2878**	**0.0225**	**7,216.8610**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.75**	**17.04**	**3.47**	**2.01**	**0.00**	**44.71**	**3.30**	**0.00**	**43.85**	**9.58**	**0.00**	**2.18**	**2.18**	**16.72**	**0.00**	**2.19**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/10/2016	5	20	
4	Building Construction	Building Construction	3/11/2016	1/26/2017	5	230	
5	Paving	Paving	1/27/2017	2/23/2017	5	20	
6	Architectural Coating	Architectural Coating	2/24/2017	3/23/2017	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 316,542; Non-Residential Outdoor: 105,514 (Architectural Coating – sqft)

<u>OffRoad Equipment</u>

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	80.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	14,528.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	126.00	53.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	25.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.9056	0.0000	0.9056	0.1371	0.0000	0.1371			0.0000			0.0000
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365		4,089.284 1	4,089.284 1	1.1121		4,112.637 4
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**	**0.9056**	**2.2921**	**3.1978**	**0.1371**	**2.1365**	**2.2737**		**4,089.284 1**	**4,089.284 1**	**1.1121**		**4,112.637 4**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Hauling	0.0906	1.0043	0.9693	2.9800e-003	0.0698	0.0161	0.0858	0.0191	0.0148	0.0339		299.6280	299.6280	2.1200e-003		299.6725
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**0.1568**	**1.0680**	**1.7874**	**4.5600e-003**	**0.1930**	**0.0170**	**0.2100**	**0.0518**	**0.0156**	**0.0674**		**429.1956**	**429.1956**	**8.5700e-003**		**429.3756**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Fugitive Dust					0.9056	0.0000	0.9056	0.1371	0.0000	0.1371			0.0000			0.0000
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365	0.0000	4,089.2841	4,089.2841	1.1121		4,112.6374
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**	**0.9056**	**2.2921**	**3.1978**	**0.1371**	**2.1365**	**2.2737**	**0.0000**	**4,089.2841**	**4,089.2841**	**1.1121**		**4,112.6374**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0906	1.0043	0.9693	2.9800e-003	0.0698	0.0161	0.0858	0.0191	0.0148	0.0339		299.6280	299.6280	2.1200e-003		299.6725
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**0.1568**	**1.0680**	**1.7874**	**4.5600e-003**	**0.1930**	**0.0170**	**0.2100**	**0.0518**	**0.0156**	**0.0674**		**429.1956**	**429.1956**	**8.5700e-003**		**429.3756**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0795	0.0765	0.9817	1.8900e-003	0.1479	1.1100e-003	0.1490	0.0392	1.0200e-003	0.0402		155.4812	155.4812	7.7400e-003		155.6437
Total	**0.0795**	**0.0765**	**0.9817**	**1.8900e-003**	**0.1479**	**1.1100e-003**	**0.1490**	**0.0392**	**1.0200e-003**	**0.0402**		**155.4812**	**155.4812**	**7.7400e-003**		**155.6437**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0795	0.0765	0.9817	1.8900e-003	0.1479	1.1100e-003	0.1490	0.0392	1.0200e-003	0.0402		155.4812	155.4812	7.7400e-003		155.6437
Total	**0.0795**	**0.0765**	**0.9817**	**1.8900e-003**	**0.1479**	**1.1100e-003**	**0.1490**	**0.0392**	**1.0200e-003**	**0.0402**		**155.4812**	**155.4812**	**7.7400e-003**		**155.6437**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.7541	0.0000	7.7541	3.5495	0.0000	3.5495			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225		3,093.788 9	3,093.788 9	0.9332		3,113.386 0
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**7.7541**	**2.1984**	**9.9525**	**3.5495**	**2.0225**	**5.5720**		**3,093.788 9**	**3,093.788 9**	**0.9332**		**3,113.386 0**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	16.4534	182.3815	176.0193	0.5405	12.6721	2.9144	15.5865	3.4714	2.6791	6.1505		54,412.4357	54,412.4357	0.3849		54,420.5179
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**16.5197**	**182.4452**	**176.8374**	**0.5421**	**12.7953**	**2.9153**	**15.7106**	**3.5041**	**2.6799**	**6.1840**		**54,542.0034**	**54,542.0034**	**0.3913**		**54,550.2210**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.7541	0.0000	7.7541	3.5495	0.0000	3.5495			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225	0.0000	3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**7.7541**	**2.1984**	**9.9525**	**3.5495**	**2.0225**	**5.5720**	**0.0000**	**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	16.4534	182.3815	176.0193	0.5405	12.6721	2.9144	15.5865	3.4714	2.6791	6.1505		54,412.4357	54,412.4357	0.3849		54,420.5179
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0662	0.0637	0.8181	1.5800e-003	0.1232	9.2000e-004	0.1242	0.0327	8.5000e-004	0.0335		129.5676	129.5676	6.4500e-003		129.7031
Total	**16.5197**	**182.4452**	**176.8374**	**0.5421**	**12.7953**	**2.9153**	**15.7106**	**3.5041**	**2.6799**	**6.1840**		**54,542.0034**	**54,542.0034**	**0.3913**		**54,550.2210**

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.5 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6566	4.7400	6.8898	0.0126	0.3515	0.0808	0.4323	0.1002	0.0742	0.1744		1,258.856 5	1,258.856 5	9.8700e-003		1,259.063 7
Worker	0.5564	0.5353	6.8722	0.0133	1.0351	7.7700e-003	1.0428	0.2746	7.1100e-003	0.2817		1,088.368 1	1,088.368 1	0.0542		1,089.506 2
Total	**1.2130**	**5.2753**	**13.7619**	**0.0258**	**1.3866**	**0.0885**	**1.4751**	**0.3748**	**0.0813**	**0.4561**		**2,347.224 5**	**2,347.224 5**	**0.0641**		**2,348.569 9**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category					lb/day								lb/day			
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.286 4	2,669.286 4	0.6620		2,683.189 0
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.286 4**	**2,669.286 4**	**0.6620**		**2,683.189 0**

3.5 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6566	4.7400	6.8898	0.0126	0.3515	0.0808	0.4323	0.1002	0.0742	0.1744		1,258.8565	1,258.8565	9.8700e-003		1,259.0637
Worker	0.5564	0.5353	6.8722	0.0133	1.0351	7.7700e-003	1.0428	0.2746	7.1100e-003	0.2817		1,088.3681	1,088.3681	0.0542		1,089.5062
Total	**1.2130**	**5.2753**	**13.7619**	**0.0258**	**1.3866**	**0.0885**	**1.4751**	**0.3748**	**0.0813**	**0.4561**		**2,347.2245**	**2,347.2245**	**0.0641**		**2,348.5699**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5723	4.1801	6.1779	0.0125	0.3516	0.0681	0.4196	0.1003	0.0625	0.1628		1,237.303 3	1,237.303 3	9.1700e-003		1,237.495 9
Worker	0.4879	0.4746	6.0744	0.0132	1.0351	7.4300e-003	1.0425	0.2746	6.8300e-003	0.2814		1,045.333 4	1,045.333 4	0.0491		1,046.364 8
Total	**1.0602**	**4.6546**	**12.2523**	**0.0258**	**1.3866**	**0.0755**	**1.4621**	**0.3748**	**0.0694**	**0.4442**		**2,282.636 7**	**2,282.636 7**	**0.0583**		**2,283.860 7**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.805 3	2,639.805 3	0.6497		2,653.449 0
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.805 3**	**2,639.805 3**	**0.6497**		**2,653.449 0**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5723	4.1801	6.1779	0.0125	0.3516	0.0681	0.4196	0.1003	0.0625	0.1628		1,237.303 3	1,237.303 3	9.1700e-003		1,237.495 9
Worker	0.4879	0.4746	6.0744	0.0132	1.0351	7.4300e-003	1.0425	0.2746	6.8300e-003	0.2814		1,045.333 4	1,045.333 4	0.0491		1,046.364 8
Total	**1.0602**	**4.6546**	**12.2523**	**0.0258**	**1.3866**	**0.0755**	**1.4621**	**0.3748**	**0.0694**	**0.4442**		**2,282.636 7**	**2,282.636 7**	**0.0583**		**2,283.860 7**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.058 8	2,281.058 8	0.6989		2,295.736 0
Paving	0.3472					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2545**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.058 8**	**2,281.058 8**	**0.6989**		**2,295.736 0**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0565	0.7232	1.5800e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		124.4445	124.4445	5.8500e-003		124.5672
Total	**0.0581**	**0.0565**	**0.7232**	**1.5800e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**124.4445**	**124.4445**	**5.8500e-003**		**124.5672**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.058 8	2,281.058 8	0.6989		2,295.736 0
Paving	0.3472					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2545**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.058 8**	**2,281.058 8**	**0.6989**		**2,295.736 0**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0581	0.0565	0.7232	1.5800e-003	0.1232	8.8000e-004	0.1241	0.0327	8.1000e-004	0.0335		124.4445	124.4445	5.8500e-003		124.5672
Total	**0.0581**	**0.0565**	**0.7232**	**1.5800e-003**	**0.1232**	**8.8000e-004**	**0.1241**	**0.0327**	**8.1000e-004**	**0.0335**		**124.4445**	**124.4445**	**5.8500e-003**		**124.5672**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	244.5287					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**244.8610**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0968	0.0942	1.2053	2.6300e-003	0.2054	1.4700e-003	0.2068	0.0545	1.3600e-003	0.0558		207.4074	207.4074	9.7500e-003		207.6121
Total	**0.0968**	**0.0942**	**1.2053**	**2.6300e-003**	**0.2054**	**1.4700e-003**	**0.2068**	**0.0545**	**1.3600e-003**	**0.0558**		**207.4074**	**207.4074**	**9.7500e-003**		**207.6121**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	244.5287					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**244.8610**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0968	0.0942	1.2053	2.6300e-003	0.2054	1.4700e-003	0.2068	0.0545	1.3600e-003	0.0558		207.4074	207.4074	9.7500e-003		207.6121
Total	**0.0968**	**0.0942**	**1.2053**	**2.6300e-003**	**0.2054**	**1.4700e-003**	**0.2068**	**0.0545**	**1.3600e-003**	**0.0558**		**207.4074**	**207.4074**	**9.7500e-003**		**207.6121**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.0325	5,819.0325	0.2159		5,823.5654
Unmitigated	3.4904	7.9098	33.9648	0.0683	4.2495	0.1093	4.3588	1.1367	0.1005	1.2371		5,819.0325	5,819.0325	0.2159		5,823.5654

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Light Industry	0.00	0.00	0.00		
Government Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	500.08	500.08	0.00	1,074,278	1,074,278
Research & Development	297.04	297.04	0.00	638,105	638,105
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	797.12	797.12	0.00	1,712,383	1,712,383

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Government Office Building	9.50	7.30	7.30	33.00	62.00	5.00	50	34	16
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.1125	1.0231	0.8594	6.1400e-003		0.0778	0.0778		0.0778	0.0778		1,227.6616	1,227.6616	0.0235	0.0225	1,235.1329
NaturalGas Unmitigated	0.1125	1.0231	0.8594	6.1400e-003		0.0778	0.0778		0.0778	0.0778		1,227.6616	1,227.6616	0.0235	0.0225	1,235.1329

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1126.44	0.0122	0.1104	0.0928	6.6000e-004		8.3900e-003	8.3900e-003		8.3900e-003	8.3900e-003		132.5222	132.5222	2.5400e-003	2.4300e-003	133.3287
Government Office Building	117.945	1.2700e-003	0.0116	9.7100e-003	7.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		13.8759	13.8759	2.7000e-004	2.5000e-004	13.9604
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	2966.29	0.0320	0.2908	0.2443	1.7400e-003		0.0221	0.0221		0.0221	0.0221		348.9750	348.9750	6.6900e-003	6.4000e-003	351.0988
Research & Development	4993.88	0.0539	0.4896	0.4113	2.9400e-003		0.0372	0.0372		0.0372	0.0372		587.5149	587.5149	0.0113	0.0108	591.0904
Unrefrigerated Warehouse-No Rail	180	1.9400e-003	0.0177	0.0148	1.1000e-004		1.3400e-003	1.3400e-003		1.3400e-003	1.3400e-003		21.1765	21.1765	4.1000e-004	3.9000e-004	21.3054
Unrefrigerated Warehouse-No Rail	600	6.4700e-003	0.0588	0.0494	3.5000e-004		4.4700e-003	4.4700e-003		4.4700e-003	4.4700e-003		70.5882	70.5882	1.3500e-003	1.2900e-003	71.0178
General Heavy Industry	450.575	4.8600e-003	0.0442	0.0371	2.7000e-004		3.3600e-003	3.3600e-003		3.3600e-003	3.3600e-003		53.0089	53.0089	1.0200e-003	9.7000e-004	53.3315
Total		**0.1125**	**1.0231**	**0.8594**	**6.1400e-003**		**0.0778**	**0.0778**		**0.0778**	**0.0778**		**1,227.6616**	**1,227.6616**	**0.0235**	**0.0225**	**1,235.1329**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
General Light Industry	1.12644	0.0122	0.1104	0.0928	6.6000e-004		8.3900e-003	8.3900e-003		8.3900e-003	8.3900e-003		132.5222	132.5222	2.5400e-003	2.4300e-003	133.3287
Government Office Building	0.117945	1.2700e-003	0.0116	9.7100e-003	7.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		13.8759	13.8759	2.7000e-004	2.5000e-004	13.9604
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	2.96629	0.0320	0.2908	0.2443	1.7400e-003		0.0221	0.0221		0.0221	0.0221		348.9750	348.9750	6.6900e-003	6.4000e-003	351.0988
Research & Development	4.99388	0.0539	0.4896	0.4113	2.9400e-003		0.0372	0.0372		0.0372	0.0372		587.5149	587.5149	0.0113	0.0108	591.0904
Unrefrigerated Warehouse-No Rail	0.18	1.9400e-003	0.0177	0.0148	1.1000e-004		1.3400e-003	1.3400e-003		1.3400e-003	1.3400e-003		21.1765	21.1765	4.1000e-004	3.9000e-004	21.3054
Unrefrigerated Warehouse-No Rail	0.6	6.4700e-003	0.0588	0.0494	3.5000e-004		4.4700e-003	4.4700e-003		4.4700e-003	4.4700e-003		70.5882	70.5882	1.3500e-003	1.2900e-003	71.0178
General Heavy Industry	0.450575	4.8600e-003	0.0442	0.0371	2.7000e-004		3.3600e-003	3.3600e-003		3.3600e-003	3.3600e-003		53.0089	53.0089	1.0200e-003	9.7000e-004	53.3315
Total		**0.1125**	**1.0231**	**0.8594**	**6.1400e-003**		**0.0778**	**0.0778**		**0.0778**	**0.0778**		**1,227.6616**	**1,227.6616**	**0.0235**	**0.0225**	**1,235.1329**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.3021	4.9000e-004	0.0522	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1098	0.1098	3.1000e-004		0.1162
Unmitigated	8.3021	4.9000e-004	0.0522	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1098	0.1098	3.1000e-004		0.1162

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3399					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.9571					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0522	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1098	0.1098	3.1000e-004		0.1162
Total	**8.3021**	**4.9000e-004**	**0.0522**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1098**	**0.1098**	**3.1000e-004**		**0.1162**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3399					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	6.9571					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.0300e-003	4.9000e-004	0.0522	0.0000		1.9000e-004	1.9000e-004		1.9000e-004	1.9000e-004		0.1098	0.1098	3.1000e-004		0.1162
Total	**8.3021**	**4.9000e-004**	**0.0522**	**0.0000**		**1.9000e-004**	**1.9000e-004**		**1.9000e-004**	**1.9000e-004**		**0.1098**	**0.1098**	**3.1000e-004**		**0.1162**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.2120	1.8355	1.2554	1.5300e-003		0.1514	0.1514		0.1393	0.1393		157.0360	157.0360	0.0481		158.0465
Total	**0.2120**	**1.8355**	**1.2554**	**1.5300e-003**		**0.1514**	**0.1514**		**0.1393**	**0.1393**		**157.0360**	**157.0360**	**0.0481**		**158.0465**

10.0 Vegetation

Rio Vista Alt 3 off-channel marina

Sacramento Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	65
Climate Zone	4			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined land use to represent marina work off channel at Rio Vista. This run is for construction only.

Construction Phase - Construction schedule from Moffatt & Nichol. Conservatively assume 2016 dates.

Off-road Equipment - Tug represented as other material with hp 400, pile driving 350 hp other construction, work skiff other general industrial 400 hp

Off-road Equipment - Scraper and dozer

Off-road Equipment - General industrial = work skiff 400 hp

Off-road Equipment - Other construction = pile driver 350 hp
Other material = tug 400 hp
Other general industrial = skiff 400 hp

Off-road Equipment - Other general industrial= work skiff 400 hp

Grading -

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	30.00
tblConstructionPhase	NumDays	0.00	115.00
tblConstructionPhase	PhaseStartDate	8/20/2016	8/22/2016
tblConstructionPhase	PhaseStartDate	7/23/2016	7/25/2016
tblConstructionPhase	PhaseStartDate	2/13/2016	2/15/2016
tblGrading	MaterialExported	0.00	77,000.00
tblGrading	MaterialImported	0.00	2,100.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00

tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Scrapers
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4495	5.1948	3.8195	7.4600e-003	0.5086	0.1841	0.6927	0.2233	0.1699	0.3932	0.0000	689.5562	689.5562	0.1056	0.0000	691.7742
Total	**0.4495**	**5.1948**	**3.8195**	**7.4600e-003**	**0.5086**	**0.1841**	**0.6927**	**0.2233**	**0.1699**	**0.3932**	**0.0000**	**689.5562**	**689.5562**	**0.1056**	**0.0000**	**691.7742**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4495	5.1948	3.8195	7.4600e-003	0.5086	0.1841	0.6927	0.2233	0.1699	0.3932	0.0000	689.5558	689.5558	0.1056	0.0000	691.7738
Total	**0.4495**	**5.1948**	**3.8195**	**7.4600e-003**	**0.5086**	**0.1841**	**0.6927**	**0.2233**	**0.1699**	**0.3932**	**0.0000**	**689.5558**	**689.5558**	**0.1056**	**0.0000**	**691.7738**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/4/2016	2/12/2016	5	30	
2	Rock Slope Protection/Excavation/Basin Breach	Site Preparation	2/15/2016	7/22/2016	5	115	
3	Pile Driving	Trenching	7/25/2016	8/19/2016	5	20	
4	Float Installation	Building Construction	8/22/2016	9/16/2016	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rock Slope Protection/Excavation/Basin Breach	Excavators	1	8.00	162	0.38
Rock Slope Protection/Excavation/Basin Breach	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Pile Driving	Concrete/Industrial Saws	0	8.00	81	0.73
Float Installation	Cranes	1	4.00	226	0.29
Float Installation	Forklifts	0	6.00	89	0.20
Rock Slope Protection/Excavation/Basin Breach	Graders	0	8.00	174	0.41
Pile Driving	Cranes	1	8.00	226	0.29
Pile Driving	Other Construction Equipment	1	8.00	350	0.42
Demolition	Rubber Tired Dozers	0	1.00	255	0.40
Pile Driving	Rubber Tired Dozers	0	1.00	255	0.40
Float Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Pile Driving	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Pile Driving	Other General Industrial Equipment	1	8.00	400	0.34
Rock Slope Protection/Excavation/Basin Breach	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Pile Driving	Other Material Handling Equipment	1	8.00	400	0.40
Float Installation	Generator Sets	1	8.00	84	0.74
Float Installation	Air Compressors	1	8.00	78	0.48
Float Installation	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Cranes	1	8.00	226	0.29
Demolition	Other Construction Equipment	1	8.00	350	0.42
Demolition	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Other Material Handling Equipment	1	8.00	400	0.40
Rock Slope Protection/Excavation/Basin Breach	Scrapers	1	8.00	361	0.48
Rock Slope Protection/Excavation/Basin Breach	Rubber Tired Dozers	1	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	27.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection/Excavation/	4	10.00	0.00	9,888.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Pile Driving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Float Installation	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.0800e-003	0.0000	3.0800e-003	4.7000e-004	0.0000	4.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0487	0.6079	0.2980	6.6000e-004		0.0240	0.0240		0.0221	0.0221	0.0000	61.8747	61.8747	0.0187	0.0000	62.2667
Total	**0.0487**	**0.6079**	**0.2980**	**6.6000e-004**	**3.0800e-003**	**0.0240**	**0.0271**	**4.7000e-004**	**0.0221**	**0.0225**	**0.0000**	**61.8747**	**61.8747**	**0.0187**	**0.0000**	**62.2667**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-004	3.5900e-003	3.7800e-003	1.0000e-005	2.3000e-004	5.0000e-005	2.8000e-004	6.0000e-005	5.0000e-005	1.1000e-004	0.0000	0.9165	0.9165	1.0000e-005	0.0000	0.9166
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**8.9000e-004**	**4.3000e-003**	**0.0109**	**2.0000e-005**	**1.4100e-003**	**6.0000e-005**	**1.4700e-003**	**3.8000e-004**	**6.0000e-005**	**4.3000e-004**	**0.0000**	**1.9812**	**1.9812**	**7.0000e-005**	**0.0000**	**1.9825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					3.0800e-003	0.0000	3.0800e-003	4.7000e-004	0.0000	4.7000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0487	0.6079	0.2980	6.6000e-004		0.0240	0.0240		0.0221	0.0221	0.0000	61.8747	61.8747	0.0187	0.0000	62.2666
Total	**0.0487**	**0.6079**	**0.2980**	**6.6000e-004**	**3.0800e-003**	**0.0240**	**0.0271**	**4.7000e-004**	**0.0221**	**0.0225**	**0.0000**	**61.8747**	**61.8747**	**0.0187**	**0.0000**	**62.2666**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	3.3000e-004	3.5900e-003	3.7800e-003	1.0000e-005	2.3000e-004	5.0000e-005	2.8000e-004	6.0000e-005	5.0000e-005	1.1000e-004	0.0000	0.9165	0.9165	1.0000e-005	0.0000	0.9166
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.6000e-004	7.1000e-004	7.1400e-003	1.0000e-005	1.1800e-003	1.0000e-005	1.1900e-003	3.2000e-004	1.0000e-005	3.2000e-004	0.0000	1.0647	1.0647	6.0000e-005	0.0000	1.0659
Total	**8.9000e-004**	**4.3000e-003**	**0.0109**	**2.0000e-005**	**1.4100e-003**	**6.0000e-005**	**1.4700e-003**	**3.8000e-004**	**6.0000e-005**	**4.3000e-004**	**0.0000**	**1.9812**	**1.9812**	**7.0000e-005**	**0.0000**	**1.9825**

3.3 Rock Slope Protection/Excavation/Basin Breach - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4154	0.0000	0.4154	0.1982	0.0000	0.1982	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2205	2.6406	1.7628	2.3500e-003		0.1125	0.1125		0.1035	0.1035	0.0000	221.4828	221.4828	0.0668	0.0000	222.8858
Total	**0.2205**	**2.6406**	**1.7628**	**2.3500e-003**	**0.4154**	**0.1125**	**0.5280**	**0.1982**	**0.1035**	**0.3017**	**0.0000**	**221.4828**	**221.4828**	**0.0668**	**0.0000**	**222.8858**

3.3 Rock Slope Protection/Excavation/Basin Breach - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1214	1.3135	1.3832	3.6800e-003	0.0833	0.0199	0.1032	0.0229	0.0183	0.0412	0.0000	335.6344	335.6344	2.3900e-003	0.0000	335.6846
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1300e-003	2.7200e-003	0.0274	5.0000e-005	4.5400e-003	4.0000e-005	4.5800e-003	1.2100e-003	3.0000e-005	1.2400e-003	0.0000	4.0813	4.0813	2.2000e-004	0.0000	4.0860
Total	**0.1236**	**1.3162**	**1.4106**	**3.7300e-003**	**0.0879**	**0.0199**	**0.1078**	**0.0241**	**0.0183**	**0.0424**	**0.0000**	**339.7157**	**339.7157**	**2.6100e-003**	**0.0000**	**339.7706**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4154	0.0000	0.4154	0.1982	0.0000	0.1982	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2205	2.6406	1.7628	2.3500e-003		0.1125	0.1125		0.1035	0.1035	0.0000	221.4826	221.4826	0.0668	0.0000	222.8855
Total	**0.2205**	**2.6406**	**1.7628**	**2.3500e-003**	**0.4154**	**0.1125**	**0.5280**	**0.1982**	**0.1035**	**0.3017**	**0.0000**	**221.4826**	**221.4826**	**0.0668**	**0.0000**	**222.8855**

3.3 Rock Slope Protection/Excavation/Basin Breach - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1214	1.3135	1.3832	3.6800e-003	0.0833	0.0199	0.1032	0.0229	0.0183	0.0412	0.0000	335.6344	335.6344	2.3900e-003	0.0000	335.6846
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.1300e-003	2.7200e-003	0.0274	5.0000e-005	4.5400e-003	4.0000e-005	4.5800e-003	1.2100e-003	3.0000e-005	1.2400e-003	0.0000	4.0813	4.0813	2.2000e-004	0.0000	4.0860
Total	**0.1236**	**1.3162**	**1.4106**	**3.7300e-003**	**0.0879**	**0.0199**	**0.1078**	**0.0241**	**0.0183**	**0.0424**	**0.0000**	**339.7157**	**339.7157**	**2.6100e-003**	**0.0000**	**339.7706**

3.4 Pile Driving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0323	0.4027	0.1975	4.3000e-004		0.0159	0.0159		0.0146	0.0146	0.0000	40.9872	40.9872	0.0124	0.0000	41.2468
Total	**0.0323**	**0.4027**	**0.1975**	**4.3000e-004**		**0.0159**	**0.0159**		**0.0146**	**0.0146**	**0.0000**	**40.9872**	**40.9872**	**0.0124**	**0.0000**	**41.2468**

3.4 Pile Driving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	4.7000e-004	4.7600e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7098	0.7098	4.0000e-005	0.0000	0.7106
Total	**3.7000e-004**	**4.7000e-004**	**4.7600e-003**	**1.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7098**	**0.7098**	**4.0000e-005**	**0.0000**	**0.7106**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0323	0.4027	0.1975	4.3000e-004		0.0159	0.0159		0.0146	0.0146	0.0000	40.9871	40.9871	0.0124	0.0000	41.2468
Total	**0.0323**	**0.4027**	**0.1975**	**4.3000e-004**		**0.0159**	**0.0159**		**0.0146**	**0.0146**	**0.0000**	**40.9871**	**40.9871**	**0.0124**	**0.0000**	**41.2468**

3.4 Pile Driving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.7000e-004	4.7000e-004	4.7600e-003	1.0000e-005	7.9000e-004	1.0000e-005	8.0000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7098	0.7098	4.0000e-005	0.0000	0.7106
Total	**3.7000e-004**	**4.7000e-004**	**4.7600e-003**	**1.0000e-005**	**7.9000e-004**	**1.0000e-005**	**8.0000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7098**	**0.7098**	**4.0000e-005**	**0.0000**	**0.7106**

3.5 Float Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2227	0.1351	2.5000e-004		0.0118	0.0118		0.0113	0.0113	0.0000	22.8049	22.8049	5.0700e-003	0.0000	22.9113
Total	**0.0232**	**0.2227**	**0.1351**	**2.5000e-004**		**0.0118**	**0.0118**		**0.0113**	**0.0113**	**0.0000**	**22.8049**	**22.8049**	**5.0700e-003**	**0.0000**	**22.9113**

3.5 Float Installation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0232	0.2227	0.1351	2.5000e-004		0.0118	0.0118		0.0113	0.0113	0.0000	22.8048	22.8048	5.0700e-003	0.0000	22.9112
Total	**0.0232**	**0.2227**	**0.1351**	**2.5000e-004**		**0.0118**	**0.0118**		**0.0113**	**0.0113**	**0.0000**	**22.8048**	**22.8048**	**5.0700e-003**	**0.0000**	**22.9112**

3.5 Float Installation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Rio Vista Alt 3 off-channel marina

Sacramento Valley Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	3.5	**Precipitation Freq (Days)**	65
Climate Zone	4			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined land use to represent marina work off channel at Rio Vista. This run is for construction only.

Construction Phase - Construction schedule from Moffatt & Nichol. Conservatively assume 2016 dates.

Off-road Equipment - Tug represented as other material with hp 400, pile driving 350 hp other construction, work skiff other general industrial 400 hp

Off-road Equipment - Scraper and dozer

Off-road Equipment - General industrial = work skiff 400 hp

Off-road Equipment - Other construction = pile driver 350 hp
Other material = tug 400 hp
Other general industrial = skiff 400 hp

Off-road Equipment - Other general industrial= work skiff 400 hp

Grading -

Demolition -

Table Name	Column Name	Default Value	New Value
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	30.00
tblConstructionPhase	NumDays	0.00	115.00
tblConstructionPhase	PhaseStartDate	8/20/2016	8/22/2016
tblConstructionPhase	PhaseStartDate	7/23/2016	7/25/2016
tblConstructionPhase	PhaseStartDate	2/13/2016	2/15/2016
tblGrading	MaterialExported	0.00	77,000.00
tblGrading	MaterialImported	0.00	2,100.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00

tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	LoadFactor	0.38	0.38
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	LoadFactor	0.29	0.29
tblOffRoadEquipment	LoadFactor	0.42	0.42
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	LoadFactor	0.40	0.40
tblOffRoadEquipment	LoadFactor	0.34	0.34
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Scrapers
tblOffRoadEquipment	OffRoadEquipmentType		Rubber Tired Dozers
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Other Construction Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Other Material Handling Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Other General Industrial Equipment
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblProjectCharacteristics	OperationalYear	2014	2017

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.8270	67.5533	52.0372	0.1059	8.8070	2.3024	11.1093	3.8790	2.1179	5.9969	0.0000	10,773.04 23	10,773.04 23	1.3763	0.0000	10,801.94 51
Total	**5.8270**	**67.5533**	**52.0372**	**0.1059**	**8.8070**	**2.3024**	**11.1093**	**3.8790**	**2.1179**	**5.9969**	**0.0000**	**10,773.04 23**	**10,773.04 23**	**1.3763**	**0.0000**	**10,801.94 51**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.8270	67.5533	52.0372	0.1059	8.8070	2.3024	11.1093	3.8790	2.1179	5.9969	0.0000	10,773.04 23	10,773.04 23	1.3763	0.0000	10,801.94 50
Total	**5.8270**	**67.5533**	**52.0372**	**0.1059**	**8.8070**	**2.3024**	**11.1093**	**3.8790**	**2.1179**	**5.9969**	**0.0000**	**10,773.04 23**	**10,773.04 23**	**1.3763**	**0.0000**	**10,801.94 50**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/4/2016	2/12/2016	5	30	
2	Rock Slope Protection/Excavation/Basin Breach	Site Preparation	2/15/2016	7/22/2016	5	115	
3	Pile Driving	Trenching	7/25/2016	8/19/2016	5	20	
4	Float Installation	Building Construction	8/22/2016	9/16/2016	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Rock Slope Protection/Excavation/Basin Breach	Excavators	1	8.00	162	0.38
Rock Slope Protection/Excavation/Basin Breach	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Pile Driving	Concrete/Industrial Saws	0	8.00	81	0.73
Float Installation	Cranes	1	4.00	226	0.29
Float Installation	Forklifts	0	6.00	89	0.20
Rock Slope Protection/Excavation/Basin Breach	Graders	0	8.00	174	0.41
Pile Driving	Cranes	1	8.00	226	0.29
Pile Driving	Other Construction Equipment	1	8.00	350	0.42
Demolition	Rubber Tired Dozers	0	1.00	255	0.40
Pile Driving	Rubber Tired Dozers	0	1.00	255	0.40
Float Installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Demolition	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Pile Driving	Tractors/Loaders/Backhoes	0	6.00	97	0.37
Pile Driving	Other General Industrial Equipment	1	8.00	400	0.34
Rock Slope Protection/Excavation/Basin Breach	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Pile Driving	Other Material Handling Equipment	1	8.00	400	0.40
Float Installation	Generator Sets	1	8.00	84	0.74
Float Installation	Air Compressors	1	8.00	78	0.48
Float Installation	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Cranes	1	8.00	226	0.29
Demolition	Other Construction Equipment	1	8.00	350	0.42
Demolition	Other General Industrial Equipment	1	8.00	400	0.34
Demolition	Other Material Handling Equipment	1	8.00	400	0.40
Rock Slope Protection/Excavation/Basin Breach	Scrapers	1	8.00	361	0.48
Rock Slope Protection/Excavation/Basin Breach	Rubber Tired Dozers	1	8.00	255	0.40

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	4	10.00	0.00	27.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Rock Slope Protection/Excavation/	4	10.00	0.00	9,888.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Pile Driving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Float Installation	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2053	0.0000	0.2053	0.0311	0.0000	0.0311			0.0000			0.0000
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704		4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**	**0.2053**	**1.5983**	**1.8035**	**0.0311**	**1.4704**	**1.5015**		**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0204	0.2260	0.2181	6.7000e-004	0.0157	3.6100e-003	0.0193	4.3000e-003	3.3200e-003	7.6200e-003		67.4163	67.4163	4.8000e-004		67.4263
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0646**	**0.2685**	**0.7635**	**1.7200e-003**	**0.0979**	**4.2300e-003**	**0.1021**	**0.0261**	**3.8800e-003**	**0.0300**		**153.7947**	**153.7947**	**4.7800e-003**		**153.8951**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.2053	0.0000	0.2053	0.0311	0.0000	0.0311			0.0000			0.0000
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704	0.0000	4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**	**0.2053**	**1.5983**	**1.8035**	**0.0311**	**1.4704**	**1.5015**	**0.0000**	**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0204	0.2260	0.2181	6.7000e-004	0.0157	3.6100e-003	0.0193	4.3000e-003	3.3200e-003	7.6200e-003		67.4163	67.4163	4.8000e-004		67.4263
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0646**	**0.2685**	**0.7635**	**1.7200e-003**	**0.0979**	**4.2300e-003**	**0.1021**	**0.0261**	**3.8800e-003**	**0.0300**		**153.7947**	**153.7947**	**4.7800e-003**		**153.8951**

3.3 Rock Slope Protection/Excavation/Basin Breach - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.2248	0.0000	7.2248	3.4463	0.0000	3.4463			0.0000			0.0000
Off-Road	3.8353	45.9226	30.6567	0.0409		1.9568	1.9568		1.8003	1.8003		4,245.9657	4,245.9657	1.2807		4,272.8611
Total	**3.8353**	**45.9226**	**30.6567**	**0.0409**	**7.2248**	**1.9568**	**9.1816**	**3.4463**	**1.8003**	**5.2465**		**4,245.9657**	**4,245.9657**	**1.2807**		**4,272.8611**

3.3 Rock Slope Protection/Excavation/Basin Breach - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9476	21.5882	20.8351	0.0640	1.5000	0.3450	1.8449	0.4109	0.3171	0.7280		6,440.6982	6,440.6982	0.0456		6,441.6549
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**1.9917**	**21.6306**	**21.3805**	**0.0650**	**1.5821**	**0.3456**	**1.9277**	**0.4327**	**0.3177**	**0.7504**		**6,527.0766**	**6,527.0766**	**0.0499**		**6,528.1236**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					7.2248	0.0000	7.2248	3.4463	0.0000	3.4463			0.0000			0.0000
Off-Road	3.8353	45.9226	30.6567	0.0409		1.9568	1.9568		1.8003	1.8003	0.0000	4,245.9657	4,245.9657	1.2807		4,272.8611
Total	**3.8353**	**45.9226**	**30.6567**	**0.0409**	**7.2248**	**1.9568**	**9.1816**	**3.4463**	**1.8003**	**5.2465**	**0.0000**	**4,245.9657**	**4,245.9657**	**1.2807**		**4,272.8611**

3.3 Rock Slope Protection/Excavation/Basin Breach - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9476	21.5882	20.8351	0.0640	1.5000	0.3450	1.8449	0.4109	0.3171	0.7280		6,440.698 2	6,440.698 2	0.0456		6,441.654 9
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**1.9917**	**21.6306**	**21.3805**	**0.0650**	**1.5821**	**0.3456**	**1.9277**	**0.4327**	**0.3177**	**0.7504**		**6,527.076 6**	**6,527.076 6**	**0.0499**		**6,528.123 6**

3.4 Pile Driving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2283	40.2694	19.7462	0.0435		1.5882	1.5882		1.4612	1.4612		4,518.062 3	4,518.062 3	1.3628		4,546.681 3
Total	**3.2283**	**40.2694**	**19.7462**	**0.0435**		**1.5882**	**1.5882**		**1.4612**	**1.4612**		**4,518.062 3**	**4,518.062 3**	**1.3628**		**4,546.681 3**

3.4 Pile Driving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0442**	**0.0425**	**0.5454**	**1.0500e-003**	**0.0822**	**6.2000e-004**	**0.0828**	**0.0218**	**5.6000e-004**	**0.0224**		**86.3784**	**86.3784**	**4.3000e-003**		**86.4688**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2283	40.2694	19.7462	0.0435		1.5882	1.5882		1.4612	1.4612	0.0000	4,518.0623	4,518.0623	1.3628		4,546.6813
Total	**3.2283**	**40.2694**	**19.7462**	**0.0435**		**1.5882**	**1.5882**		**1.4612**	**1.4612**	**0.0000**	**4,518.0623**	**4,518.0623**	**1.3628**		**4,546.6813**

3.4 Pile Driving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0442	0.0425	0.5454	1.0500e-003	0.0822	6.2000e-004	0.0828	0.0218	5.6000e-004	0.0224		86.3784	86.3784	4.3000e-003		86.4688
Total	**0.0442**	**0.0425**	**0.5454**	**1.0500e-003**	**0.0822**	**6.2000e-004**	**0.0828**	**0.0218**	**5.6000e-004**	**0.0224**		**86.3784**	**86.3784**	**4.3000e-003**		**86.4688**

3.5 Float Installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3149	22.2668	13.5122	0.0251		1.1775	1.1775		1.1314	1.1314		2,513.8065	2,513.8065	0.5584		2,525.5325
Total	**2.3149**	**22.2668**	**13.5122**	**0.0251**		**1.1775**	**1.1775**		**1.1314**	**1.1314**		**2,513.8065**	**2,513.8065**	**0.5584**		**2,525.5325**

3.5 Float Installation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.3149	22.2668	13.5122	0.0251		1.1775	1.1775		1.1314	1.1314	0.0000	2,513.8065	2,513.8065	0.5584		2,525.5325
Total	**2.3149**	**22.2668**	**13.5122**	**0.0251**		**1.1775**	**1.1775**		**1.1314**	**1.1314**	**0.0000**	**2,513.8065**	**2,513.8065**	**0.5584**		**2,525.5325**

3.5 Float Installation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.462386	0.061858	0.181346	0.154042	0.057199	0.007292	0.019609	0.042252	0.001830	0.001673	0.006973	0.000697	0.002843

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Delta Research Station Alt 4

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	2.50	1000sqft	0.06	2,500.00	0
Research & Development	66.50	1000sqft	1.53	66,500.00	0
Research & Development	39.50	1000sqft	0.91	39,500.00	0
General Heavy Industry	6.00	1000sqft	0.14	6,000.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	308.00	Space	2.77	123,200.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	2			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Off-road Equipment -

Grading -

Vehicle Trips - Assigned 797 trips to R&D, Monday through Saturday.

Operational Off-Road Equipment - Assumed a forklift.

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	22,198.00
tblGrading	MaterialImported	0.00	22,073.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	7.52
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	68.93	0.00
tblVehicleTrips	WD_TR	8.11	7.52
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.6639	5.5091	5.1317	8.5400e-003	0.3578	0.2896	0.6475	0.1379	0.2708	0.4086	0.0000	754.7073	754.7073	0.0955	0.0000	756.7130
2017	1.5877	0.5289	0.4832	7.9000e-004	0.0166	0.0309	0.0475	4.4900e-003	0.0289	0.0334	0.0000	68.4568	68.4568	0.0129	0.0000	68.7274
Total	**2.2516**	**6.0380**	**5.6149**	**9.3300e-003**	**0.3745**	**0.3206**	**0.6950**	**0.1423**	**0.2997**	**0.4420**	**0.0000**	**823.1641**	**823.1641**	**0.1084**	**0.0000**	**825.4404**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.6639	5.5091	5.1317	8.5400e-003	0.3578	0.2896	0.6475	0.1379	0.2708	0.4086	0.0000	754.7069	754.7069	0.0955	0.0000	756.7126
2017	1.5877	0.5289	0.4832	7.9000e-004	0.0166	0.0309	0.0475	4.4900e-003	0.0289	0.0334	0.0000	68.4568	68.4568	0.0129	0.0000	68.7273
Total	**2.2516**	**6.0380**	**5.6149**	**9.3300e-003**	**0.3745**	**0.3206**	**0.6950**	**0.1423**	**0.2997**	**0.4420**	**0.0000**	**823.1636**	**823.1636**	**0.1084**	**0.0000**	**825.4399**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.4734	5.0000e-005	4.9000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.3500e-003	9.3500e-003	3.0000e-005	0.0000	9.8900e-003
Energy	0.0172	0.1560	0.1310	9.4000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	685.9031	685.9031	0.0266	7.9400e-003	688.9234
Mobile	0.5844	1.9795	6.6295	0.0116	0.6513	0.0265	0.6779	0.1750	0.0244	0.1994	0.0000	925.4064	925.4064	0.0303	0.0000	926.0432
Offroad	0.0274	0.2374	0.1624	2.0000e-004		0.0196	0.0196		0.0180	0.0180	0.0000	18.4278	18.4278	5.6500e-003	0.0000	18.5463
Waste						0.0000	0.0000		0.0000	0.0000	24.1661	0.0000	24.1661	1.4282	0.0000	54.1577
Water						0.0000	0.0000		0.0000	0.0000	24.5061	121.9019	146.4080	2.5225	0.0606	218.1584
Total	**2.1023**	**2.3730**	**6.9279**	**0.0128**	**0.6513**	**0.0580**	**0.7093**	**0.1750**	**0.0543**	**0.2293**	**48.6721**	**1,751.6486**	**1,800.3207**	**4.0133**	**0.0685**	**1,905.8389**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.4734	5.0000e-005	4.9000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.3500e-003	9.3500e-003	3.0000e-005	0.0000	9.8900e-003
Energy	0.0172	0.1560	0.1310	9.4000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	685.9031	685.9031	0.0266	7.9400e-003	688.9234
Mobile	0.5844	1.9795	6.6295	0.0116	0.6513	0.0265	0.6779	0.1750	0.0244	0.1994	0.0000	925.4064	925.4064	0.0303	0.0000	926.0432
Offroad	0.0274	0.2374	0.1624	2.0000e-004		0.0196	0.0196		0.0180	0.0180	0.0000	18.4278	18.4278	5.6500e-003	0.0000	18.5463
Waste						0.0000	0.0000		0.0000	0.0000	24.1661	0.0000	24.1661	1.4282	0.0000	54.1577
Water						0.0000	0.0000		0.0000	0.0000	24.5061	121.9019	146.4080	2.5221	0.0605	218.1193
Total	**2.1023**	**2.3730**	**6.9279**	**0.0128**	**0.6513**	**0.0580**	**0.7093**	**0.1750**	**0.0543**	**0.2293**	**48.6721**	**1,751.6486**	**1,800.3207**	**4.0128**	**0.0684**	**1,905.7998**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.30**	**10.01**	**2.34**	**1.57**	**0.00**	**33.78**	**2.76**	**0.00**	**33.19**	**7.86**	**0.00**	**1.05**	**1.02**	**0.15**	**0.13**	**0.98**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/10/2016	5	20	
4	Building Construction	Building Construction	3/11/2016	1/26/2017	5	230	
5	Paving	Paving	1/27/2017	2/23/2017	5	20	
6	Architectural Coating	Architectural Coating	2/24/2017	3/23/2017	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 328,044; Non-Residential Outdoor: 109,348 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	5,534.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	131.00	55.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	26.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0974	37.0974	0.0101	0.0000	37.3092
Total	**0.0429**	**0.4566**	**0.3503**	**4.0000e-004**		**0.0229**	**0.0229**		**0.0214**	**0.0214**	**0.0000**	**37.0974**	**37.0974**	**0.0101**	**0.0000**	**37.3092**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	7.2000e-004	7.1100e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0748	1.0748	6.0000e-005	0.0000	1.0760
Total	**5.7000e-004**	**7.2000e-004**	**7.1100e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0748**	**1.0748**	**6.0000e-005**	**0.0000**	**1.0760**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0429	0.4566	0.3503	4.0000e-004		0.0229	0.0229		0.0214	0.0214	0.0000	37.0973	37.0973	0.0101	0.0000	37.3092
Total	**0.0429**	**0.4566**	**0.3503**	**4.0000e-004**		**0.0229**	**0.0229**		**0.0214**	**0.0214**	**0.0000**	**37.0973**	**37.0973**	**0.0101**	**0.0000**	**37.3092**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	7.2000e-004	7.1100e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0748	1.0748	6.0000e-005	0.0000	1.0760
Total	**5.7000e-004**	**7.2000e-004**	**7.1100e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0748**	**1.0748**	**6.0000e-005**	**0.0000**	**1.0760**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4386	18.4386	5.5600e-003	0.0000	18.5554
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.0903**	**0.0147**	**0.1050**	**0.0497**	**0.0135**	**0.0632**	**0.0000**	**18.4386**	**18.4386**	**5.5600e-003**	**0.0000**	**18.5554**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	4.3000e-004	4.2600e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.3000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6449	0.6449	4.0000e-005	0.0000	0.6456
Total	**3.4000e-004**	**4.3000e-004**	**4.2600e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6449**	**0.6449**	**4.0000e-005**	**0.0000**	**0.6456**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0903	0.0000	0.0903	0.0497	0.0000	0.0497	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0254	0.2732	0.2055	2.0000e-004		0.0147	0.0147		0.0135	0.0135	0.0000	18.4385	18.4385	5.5600e-003	0.0000	18.5553
Total	**0.0254**	**0.2732**	**0.2055**	**2.0000e-004**	**0.0903**	**0.0147**	**0.1050**	**0.0497**	**0.0135**	**0.0632**	**0.0000**	**18.4385**	**18.4385**	**5.5600e-003**	**0.0000**	**18.5553**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.4000e-004	4.3000e-004	4.2600e-003	1.0000e-005	7.2000e-004	1.0000e-005	7.3000e-004	1.9000e-004	1.0000e-005	2.0000e-004	0.0000	0.6449	0.6449	4.0000e-005	0.0000	0.6456
Total	**3.4000e-004**	**4.3000e-004**	**4.2600e-003**	**1.0000e-005**	**7.2000e-004**	**1.0000e-005**	**7.3000e-004**	**1.9000e-004**	**1.0000e-005**	**2.0000e-004**	**0.0000**	**0.6449**	**0.6449**	**4.0000e-005**	**0.0000**	**0.6456**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0688	0.0000	0.0688	0.0342	0.0000	0.0342	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0367	0.3845	0.2608	3.0000e-004		0.0220	0.0220		0.0202	0.0202	0.0000	28.0664	28.0664	8.4700e-003	0.0000	28.2442
Total	**0.0367**	**0.3845**	**0.2608**	**3.0000e-004**	**0.0688**	**0.0220**	**0.0908**	**0.0342**	**0.0202**	**0.0544**	**0.0000**	**28.0664**	**28.0664**	**8.4700e-003**	**0.0000**	**28.2442**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0659	0.7376	0.7610	2.0700e-003	0.0473	0.0114	0.0588	0.0130	0.0105	0.0235	0.0000	188.6509	188.6509	1.4100e-003	0.0000	188.6805
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	7.2000e-004	7.1100e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0748	1.0748	6.0000e-005	0.0000	1.0760
Total	**0.0665**	**0.7383**	**0.7681**	**2.0800e-003**	**0.0485**	**0.0114**	**0.0600**	**0.0133**	**0.0105**	**0.0239**	**0.0000**	**189.7257**	**189.7257**	**1.4700e-003**	**0.0000**	**189.7565**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0688	0.0000	0.0688	0.0342	0.0000	0.0342	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0367	0.3845	0.2608	3.0000e-004		0.0220	0.0220		0.0202	0.0202	0.0000	28.0664	28.0664	8.4700e-003	0.0000	28.2441
Total	**0.0367**	**0.3845**	**0.2608**	**3.0000e-004**	**0.0688**	**0.0220**	**0.0908**	**0.0342**	**0.0202**	**0.0544**	**0.0000**	**28.0664**	**28.0664**	**8.4700e-003**	**0.0000**	**28.2441**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0659	0.7376	0.7610	2.0700e-003	0.0473	0.0114	0.0588	0.0130	0.0105	0.0235	0.0000	188.6509	188.6509	1.4100e-003	0.0000	188.6805
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.7000e-004	7.2000e-004	7.1100e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0748	1.0748	6.0000e-005	0.0000	1.0760
Total	**0.0665**	**0.7383**	**0.7681**	**2.0800e-003**	**0.0485**	**0.0114**	**0.0600**	**0.0133**	**0.0105**	**0.0239**	**0.0000**	**189.7257**	**189.7257**	**1.4700e-003**	**0.0000**	**189.7565**

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3594	3.0074	1.9525	2.8300e-003		0.2076	0.2076		0.1950	0.1950	0.0000	255.4720	255.4720	0.0634	0.0000	256.8026
Total	**0.3594**	**3.0074**	**1.9525**	**2.8300e-003**		**0.2076**	**0.2076**		**0.1950**	**0.1950**	**0.0000**	**255.4720**	**255.4720**	**0.0634**	**0.0000**	**256.8026**

3.5 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0796	0.5817	0.9283	1.3800e-003	0.0378	0.0102	0.0479	0.0108	9.3400e-003	0.0202	0.0000	125.1588	125.1588	1.0900e-003	0.0000	125.1817
Worker	0.0527	0.0663	0.6549	1.3300e-003	0.1105	8.7000e-004	0.1114	0.0294	7.9000e-004	0.0302	0.0000	99.0287	99.0287	5.3800e-003	0.0000	99.1418
Total	**0.1322**	**0.6481**	**1.5832**	**2.7100e-003**	**0.1483**	**0.0110**	**0.1593**	**0.0402**	**0.0101**	**0.0503**	**0.0000**	**224.1875**	**224.1875**	**6.4700e-003**	**0.0000**	**224.3235**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.3594	3.0074	1.9525	2.8300e-003		0.2076	0.2076		0.1950	0.1950	0.0000	255.4717	255.4717	0.0634	0.0000	256.8023
Total	**0.3594**	**3.0074**	**1.9525**	**2.8300e-003**		**0.2076**	**0.2076**		**0.1950**	**0.1950**	**0.0000**	**255.4717**	**255.4717**	**0.0634**	**0.0000**	**256.8023**

3.5 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0796	0.5817	0.9283	1.3800e-003	0.0378	0.0102	0.0479	0.0108	9.3400e-003	0.0202	0.0000	125.1588	125.1588	1.0900e-003	0.0000	125.1817
Worker	0.0527	0.0663	0.6549	1.3300e-003	0.1105	8.7000e-004	0.1114	0.0294	7.9000e-004	0.0302	0.0000	99.0287	99.0287	5.3800e-003	0.0000	99.1418
Total	**0.1322**	**0.6481**	**1.5832**	**2.7100e-003**	**0.1483**	**0.0110**	**0.1593**	**0.0402**	**0.0101**	**0.0503**	**0.0000**	**224.1875**	**224.1875**	**6.4700e-003**	**0.0000**	**224.3235**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0295	0.2509	0.1722	2.5000e-004		0.0169	0.0169		0.0159	0.0159	0.0000	22.7505	22.7505	5.6000e-003	0.0000	22.8681
Total	**0.0295**	**0.2509**	**0.1722**	**2.5000e-004**		**0.0169**	**0.0169**		**0.0159**	**0.0159**	**0.0000**	**22.7505**	**22.7505**	**5.6000e-003**	**0.0000**	**22.8681**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-003	0.0462	0.0764	1.2000e-004	3.4000e-003	7.7000e-004	4.1700e-003	9.7000e-004	7.1000e-004	1.6800e-003	0.0000	11.0773	11.0773	9.0000e-005	0.0000	11.0792
Worker	4.1400e-003	5.2800e-003	0.0517	1.2000e-004	9.9500e-003	7.0000e-005	0.0100	2.6400e-003	7.0000e-005	2.7100e-003	0.0000	8.5617	8.5617	4.4000e-004	0.0000	8.5709
Total	**0.0103**	**0.0515**	**0.1280**	**2.4000e-004**	**0.0134**	**8.4000e-004**	**0.0142**	**3.6100e-003**	**7.8000e-004**	**4.3900e-003**	**0.0000**	**19.6390**	**19.6390**	**5.3000e-004**	**0.0000**	**19.6501**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0295	0.2509	0.1722	2.5000e-004		0.0169	0.0169		0.0159	0.0159	0.0000	22.7505	22.7505	5.6000e-003	0.0000	22.8681
Total	**0.0295**	**0.2509**	**0.1722**	**2.5000e-004**		**0.0169**	**0.0169**		**0.0159**	**0.0159**	**0.0000**	**22.7505**	**22.7505**	**5.6000e-003**	**0.0000**	**22.8681**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	6.2000e-003	0.0462	0.0764	1.2000e-004	3.4000e-003	7.7000e-004	4.1700e-003	9.7000e-004	7.1000e-004	1.6800e-003	0.0000	11.0773	11.0773	9.0000e-005	0.0000	11.0792
Worker	4.1400e-003	5.2800e-003	0.0517	1.2000e-004	9.9500e-003	7.0000e-005	0.0100	2.6400e-003	7.0000e-005	2.7100e-003	0.0000	8.5617	8.5617	4.4000e-004	0.0000	8.5709
Total	**0.0103**	**0.0515**	**0.1280**	**2.4000e-004**	**0.0134**	**8.4000e-004**	**0.0142**	**3.6100e-003**	**7.8000e-004**	**4.3900e-003**	**0.0000**	**19.6390**	**19.6390**	**5.3000e-004**	**0.0000**	**19.6501**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8266
Paving	3.6300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0227**	**0.2030**	**0.1473**	**2.2000e-004**		**0.0114**	**0.0114**		**0.0105**	**0.0105**	**0.0000**	**20.6934**	**20.6934**	**6.3400e-003**	**0.0000**	**20.8266**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-004	6.4000e-004	6.2300e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0319	1.0319	5.0000e-005	0.0000	1.0331
Total	**5.0000e-004**	**6.4000e-004**	**6.2300e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0319**	**1.0319**	**5.0000e-005**	**0.0000**	**1.0331**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0191	0.2030	0.1473	2.2000e-004		0.0114	0.0114		0.0105	0.0105	0.0000	20.6934	20.6934	6.3400e-003	0.0000	20.8265
Paving	3.6300e-003					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0227**	**0.2030**	**0.1473**	**2.2000e-004**		**0.0114**	**0.0114**		**0.0105**	**0.0105**	**0.0000**	**20.6934**	**20.6934**	**6.3400e-003**	**0.0000**	**20.8265**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	5.0000e-004	6.4000e-004	6.2300e-003	1.0000e-005	1.2000e-003	1.0000e-005	1.2100e-003	3.2000e-004	1.0000e-005	3.3000e-004	0.0000	1.0319	1.0319	5.0000e-005	0.0000	1.0331
Total	**5.0000e-004**	**6.4000e-004**	**6.2300e-003**	**1.0000e-005**	**1.2000e-003**	**1.0000e-005**	**1.2100e-003**	**3.2000e-004**	**1.0000e-005**	**3.3000e-004**	**0.0000**	**1.0319**	**1.0319**	**5.0000e-005**	**0.0000**	**1.0331**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.5205					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3200e-003	0.0219	0.0187	3.0000e-005		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	2.5533	2.5533	2.7000e-004	0.0000	2.5589
Total	**1.5238**	**0.0219**	**0.0187**	**3.0000e-005**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**2.5533**	**2.5533**	**2.7000e-004**	**0.0000**	**2.5589**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	1.1000e-003	0.0108	3.0000e-005	2.0800e-003	2.0000e-005	2.0900e-003	5.5000e-004	1.0000e-005	5.7000e-004	0.0000	1.7887	1.7887	9.0000e-005	0.0000	1.7906
Total	**8.6000e-004**	**1.1000e-003**	**0.0108**	**3.0000e-005**	**2.0800e-003**	**2.0000e-005**	**2.0900e-003**	**5.5000e-004**	**1.0000e-005**	**5.7000e-004**	**0.0000**	**1.7887**	**1.7887**	**9.0000e-005**	**0.0000**	**1.7906**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	1.5205					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	3.3200e-003	0.0219	0.0187	3.0000e-005		1.7300e-003	1.7300e-003		1.7300e-003	1.7300e-003	0.0000	2.5533	2.5533	2.7000e-004	0.0000	2.5589
Total	**1.5238**	**0.0219**	**0.0187**	**3.0000e-005**		**1.7300e-003**	**1.7300e-003**		**1.7300e-003**	**1.7300e-003**	**0.0000**	**2.5533**	**2.5533**	**2.7000e-004**	**0.0000**	**2.5589**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	8.6000e-004	1.1000e-003	0.0108	3.0000e-005	2.0800e-003	2.0000e-005	2.0900e-003	5.5000e-004	1.0000e-005	5.7000e-004	0.0000	1.7887	1.7887	9.0000e-005	0.0000	1.7906
Total	**8.6000e-004**	**1.1000e-003**	**0.0108**	**3.0000e-005**	**2.0800e-003**	**2.0000e-005**	**2.0900e-003**	**5.5000e-004**	**1.0000e-005**	**5.7000e-004**	**0.0000**	**1.7887**	**1.7887**	**9.0000e-005**	**0.0000**	**1.7906**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.5844	1.9795	6.6295	0.0116	0.6513	0.0265	0.6779	0.1750	0.0244	0.1994	0.0000	925.4064	925.4064	0.0303	0.0000	926.0432
Unmitigated	0.5844	1.9795	6.6295	0.0116	0.6513	0.0265	0.6779	0.1750	0.0244	0.1994	0.0000	925.4064	925.4064	0.0303	0.0000	926.0432

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Light Industry	0.00	0.00	0.00		
Government Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	500.08	500.08	0.00	1,074,278	1,074,278
Research & Development	297.04	297.04	0.00	638,105	638,105
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	797.12	797.12	0.00	1,712,383	1,712,383

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Government Office Building	9.50	7.30	7.30	33.00	62.00	5.00	50	34	16
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No Rail	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.411941	0.062653	0.156059	0.175861	0.050938	0.007827	0.019365	0.102312	0.001797	0.001584	0.006425	0.000939	0.002301

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	516.0816	516.0816	0.0233	4.8300e-003	518.0684
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	516.0816	516.0816	0.0233	4.8300e-003	518.0684
NaturalGas Mitigated	0.0172	0.1560	0.1310	9.4000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	169.8215	169.8215	3.2500e-003	3.1100e-003	170.8550
NaturalGas Unmitigated	0.0172	0.1560	0.1310	9.4000e-004		0.0119	0.0119		0.0119	0.0119	0.0000	169.8215	169.8215	3.2500e-003	3.1100e-003	170.8550

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
General Light Industry	441225	2.3800e-003	0.0216	0.0182	1.3000e-004		1.6400e-003	1.6400e-003		1.6400e-003	1.6400e-003	0.0000	23.5455	23.5455	4.5000e-004	4.3000e-004	23.6887
Government Office Building	43250	2.3000e-004	2.1200e-003	1.7800e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.3080	2.3080	4.0000e-005	4.0000e-005	2.3220
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.30407e+006	7.0300e-003	0.0639	0.0537	3.8000e-004		4.8600e-003	4.8600e-003		4.8600e-003	4.8600e-003	0.0000	69.5899	69.5899	1.3300e-003	1.2800e-003	70.0134
Research & Development	774595	4.1800e-003	0.0380	0.0319	2.3000e-004		2.8900e-003	2.8900e-003		2.8900e-003	2.8900e-003	0.0000	41.3353	41.3353	7.9000e-004	7.6000e-004	41.5869
Unrefrigerated Warehouse-No Rail	115740	6.2000e-004	5.6700e-003	4.7700e-003	3.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	6.1763	6.1763	1.2000e-004	1.1000e-004	6.2139
Unrefrigerated Warehouse-No Rail	385800	2.0800e-003	0.0189	0.0159	1.1000e-004		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	20.5878	20.5878	3.9000e-004	3.8000e-004	20.7131
General Heavy Industry	117660	6.3000e-004	5.7700e-003	4.8400e-003	3.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	6.2788	6.2788	1.2000e-004	1.2000e-004	6.3170
Total		**0.0172**	**0.1560**	**0.1311**	**9.2000e-004**		**0.0119**	**0.0119**		**0.0119**	**0.0119**	**0.0000**	**169.8215**	**169.8215**	**3.2400e-003**	**3.1200e-003**	**170.8550**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Government Office Building	43250	2.3000e-004	2.1200e-003	1.7800e-003	1.0000e-005		1.6000e-004	1.6000e-004		1.6000e-004	1.6000e-004	0.0000	2.3080	2.3080	4.0000e-005	4.0000e-005	2.3220
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	1.30407e+006	7.0300e-003	0.0639	0.0537	3.8000e-004		4.8600e-003	4.8600e-003		4.8600e-003	4.8600e-003	0.0000	69.5899	69.5899	1.3300e-003	1.2800e-003	70.0134
Research & Development	774595	4.1800e-003	0.0380	0.0319	2.3000e-004		2.8900e-003	2.8900e-003		2.8900e-003	2.8900e-003	0.0000	41.3353	41.3353	7.9000e-004	7.6000e-004	41.5869
Unrefrigerated Warehouse-No Rail	115740	6.2000e-004	5.6700e-003	4.7700e-003	3.0000e-005		4.3000e-004	4.3000e-004		4.3000e-004	4.3000e-004	0.0000	6.1763	6.1763	1.2000e-004	1.1000e-004	6.2139
Unrefrigerated Warehouse-No Rail	385800	2.0800e-003	0.0189	0.0159	1.1000e-004		1.4400e-003	1.4400e-003		1.4400e-003	1.4400e-003	0.0000	20.5878	20.5878	3.9000e-004	3.8000e-004	20.7131
General Heavy Industry	117660	6.3000e-004	5.7700e-003	4.8400e-003	3.0000e-005		4.4000e-004	4.4000e-004		4.4000e-004	4.4000e-004	0.0000	6.2788	6.2788	1.2000e-004	1.2000e-004	6.3170
General Light Industry	441225	2.3800e-003	0.0216	0.0182	1.3000e-004		1.6400e-003	1.6400e-003		1.6400e-003	1.6400e-003	0.0000	23.5455	23.5455	4.5000e-004	4.3000e-004	23.6887
Total		**0.0172**	**0.1560**	**0.1311**	**9.2000e-004**		**0.0119**	**0.0119**		**0.0119**	**0.0119**	**0.0000**	**169.8215**	**169.8215**	**3.2400e-003**	**3.1200e-003**	**170.8550**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	55380	16.1107	7.3000e-004	1.5000e-004	16.1727
General Light Industry	207675	60.4150	2.7300e-003	5.7000e-004	60.6476
Government Office Building	27925	8.1237	3.7000e-004	8.0000e-005	8.1550
Parking Lot	108416	31.5395	1.4300e-003	3.0000e-004	31.6609
Research & Development	364585	106.0620	4.8000e-003	9.9000e-004	106.4703
Research & Development	613795	178.5600	8.0700e-003	1.6700e-003	179.2474
Unrefrigerated Warehouse-No Rail	304800	88.6698	4.0100e-003	8.3000e-004	89.0112
Unrefrigerated Warehouse-No Rail	91440	26.6009	1.2000e-003	2.5000e-004	26.7034
Total		**516.0816**	**0.0233**	**4.8400e-003**	**518.0684**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
General Heavy Industry	55380	16.1107	7.3000e-004	1.5000e-004	16.1727
General Light Industry	207675	60.4150	2.7300e-003	5.7000e-004	60.6476
Government Office Building	27925	8.1237	3.7000e-004	8.0000e-005	8.1550
Parking Lot	108416	31.5395	1.4300e-003	3.0000e-004	31.6609
Research & Development	364585	106.0620	4.8000e-003	9.9000e-004	106.4703
Research & Development	613795	178.5600	8.0700e-003	1.6700e-003	179.2474
Unrefrigerated Warehouse-No Rail	304800	88.6698	4.0100e-003	8.3000e-004	89.0112
Unrefrigerated Warehouse-No Rail	91440	26.6009	1.2000e-003	2.5000e-004	26.7034
Total		**516.0816**	**0.0233**	**4.8400e-003**	**518.0684**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.4734	5.0000e-005	4.9000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.3500e-003	9.3500e-003	3.0000e-005	0.0000	9.8900e-003
Unmitigated	1.4734	5.0000e-005	4.9000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.3500e-003	9.3500e-003	3.0000e-005	0.0000	9.8900e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1521					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3208					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.7000e-004	5.0000e-005	4.9000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.3500e-003	9.3500e-003	3.0000e-005	0.0000	9.8900e-003
Total	**1.4734**	**5.0000e-005**	**4.9000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.3500e-003**	**9.3500e-003**	**3.0000e-005**	**0.0000**	**9.8900e-003**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.1521					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	1.3208					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	4.7000e-004	5.0000e-005	4.9000e-003	0.0000		2.0000e-005	2.0000e-005		2.0000e-005	2.0000e-005	0.0000	9.3500e-003	9.3500e-003	3.0000e-005	0.0000	9.8900e-003
Total	**1.4734**	**5.0000e-005**	**4.9000e-003**	**0.0000**		**2.0000e-005**	**2.0000e-005**		**2.0000e-005**	**2.0000e-005**	**0.0000**	**9.3500e-003**	**9.3500e-003**	**3.0000e-005**	**0.0000**	**9.8900e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	146.4080	2.5221	0.0605	218.1193
Unmitigated	146.4080	2.5225	0.0606	218.1584

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	1.3875 / 0	2.6243	0.0453	1.0900e-003	3.9131
General Light Industry	5.20313 / 0	9.8411	0.1699	4.0800e-003	14.6740
Government Office Building	0.496649 / 0.304398	1.2493	0.0162	3.9000e-004	1.7118
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	52.1196 / 0	98.5777	1.7020	0.0409	146.9895
Unrefrigerated Warehouse-No Rail	18.0375 / 0	34.1157	0.5890	0.0141	50.8700
Total		**146.4080**	**2.5225**	**0.0606**	**218.1584**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
General Heavy Industry	1.3875 / 0	2.6243	0.0453	1.0900e-003	3.9124
General Light Industry	5.20313 / 0	9.8411	0.1699	4.0700e-003	14.6714
Government Office Building	0.496649 / 0.304398	1.2493	0.0162	3.9000e-004	1.7115
Parking Lot	0 / 0	0.0000	0.0000	0.0000	0.0000
Research & Development	52.1196 / 0	98.5777	1.7017	0.0408	146.9631
Unrefrigerated Warehouse-No Rail	18.0375 / 0	34.1157	0.5889	0.0141	50.8609
Total		**146.4080**	**2.5221**	**0.0605**	**218.1193**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	24.1661	1.4282	0.0000	54.1577
Unmitigated	24.1661	1.4282	0.0000	54.1577

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	7.44	1.5103	0.0893	0.0000	3.3846
General Light Industry	27.9	5.6635	0.3347	0.0000	12.6922
Government Office Building	2.33	0.4730	0.0280	0.0000	1.0600
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	8.06	1.6361	0.0967	0.0000	3.6666
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**24.1661**	**1.4282**	**0.0000**	**54.1577**

8.2 Waste by Land Use

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
General Heavy Industry	7.44	1.5103	0.0893	0.0000	3.3846
General Light Industry	27.9	5.6635	0.3347	0.0000	12.6922
Government Office Building	2.33	0.4730	0.0280	0.0000	1.0600
Parking Lot	0	0.0000	0.0000	0.0000	0.0000
Research & Development	8.06	1.6361	0.0967	0.0000	3.6666
Unrefrigerated Warehouse-No Rail	73.32	14.8833	0.8796	0.0000	33.3544
Total		**24.1661**	**1.4282**	**0.0000**	**54.1577**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	tons/yr										MT/yr					
Forklifts	0.0274	0.2374	0.1624	2.0000e-004		0.0196	0.0196		0.0180	0.0180	0.0000	18.4278	18.4278	5.6500e-003	0.0000	18.5463
Total	**0.0274**	**0.2374**	**0.1624**	**2.0000e-004**		**0.0196**	**0.0196**		**0.0180**	**0.0180**	**0.0000**	**18.4278**	**18.4278**	**5.6500e-003**	**0.0000**	**18.5463**

10.0 Vegetation

Delta Research Station Alt 4

San Joaquin Valley Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Government Office Building	2.50	1000sqft	0.06	2,500.00	0
Research & Development	66.50	1000sqft	1.53	66,500.00	0
Research & Development	39.50	1000sqft	0.91	39,500.00	0
General Heavy Industry	6.00	1000sqft	0.14	6,000.00	0
General Light Industry	22.50	1000sqft	0.52	22,500.00	0
Unrefrigerated Warehouse-No Rail	18.00	1000sqft	0.41	18,000.00	0
Unrefrigerated Warehouse-No Rail	60.00	1000sqft	1.38	60,000.00	0
Parking Lot	308.00	Space	2.77	123,200.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.7 **Precipitation Freq (Days)** 45

Climate Zone 2 **Operational Year** 2017

Utility Company Pacific Gas & Electric Company

CO2 Intensity (lb/MWhr) 641.35 **CH4 Intensity (lb/MWhr)** 0.029 **N2O Intensity (lb/MWhr)** 0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Off-road Equipment -

Grading -

Vehicle Trips - Assigned 797 trips to R&D, Monday through Saturday.

Operational Off-Road Equipment - Assumed a forklift.

Table Name	Column Name	Default Value	New Value
tblGrading	MaterialExported	0.00	22,198.00
tblGrading	MaterialImported	0.00	22,073.00
tblOperationalOffRoadEquipment	OperOffRoadEquipmentNumber	0.00	1.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblVehicleTrips	ST_TR	1.50	0.00
tblVehicleTrips	ST_TR	1.32	0.00
tblVehicleTrips	ST_TR	1.90	7.52
tblVehicleTrips	ST_TR	2.59	0.00
tblVehicleTrips	SU_TR	1.50	0.00
tblVehicleTrips	SU_TR	0.68	0.00
tblVehicleTrips	SU_TR	1.11	0.00
tblVehicleTrips	SU_TR	2.59	0.00
tblVehicleTrips	WD_TR	1.50	0.00
tblVehicleTrips	WD_TR	6.97	0.00
tblVehicleTrips	WD_TR	68.93	0.00
tblVehicleTrips	WD_TR	8.11	7.52
tblVehicleTrips	WD_TR	2.59	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	9.8219	108.9085	90.3769	0.2380	18.2141	3.3406	21.1539	9.9699	3.0728	12.6745	0.0000	24,039.3786	24,039.3786	1.2339	0.0000	24,065.2901
2017	152.4829	31.5891	30.7234	0.0537	1.4423	1.8695	3.3117	0.3900	1.7541	2.1441	0.0000	5,018.2608	5,018.2608	0.7111	0.0000	5,033.1934
Total	**162.3048**	**140.4975**	**121.1003**	**0.2917**	**19.6564**	**5.2101**	**24.4657**	**10.3599**	**4.8270**	**14.8186**	**0.0000**	**29,057.6394**	**29,057.6394**	**1.9450**	**0.0000**	**29,098.4835**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	9.8219	108.9085	90.3769	0.2380	18.2141	3.3406	21.1539	9.9699	3.0728	12.6745	0.0000	24,039.3786	24,039.3786	1.2339	0.0000	24,065.2900
2017	152.4829	31.5891	30.7234	0.0537	1.4423	1.8695	3.3117	0.3900	1.7541	2.1441	0.0000	5,018.2608	5,018.2608	0.7111	0.0000	5,033.1934
Total	**162.3048**	**140.4975**	**121.1003**	**0.2917**	**19.6564**	**5.2101**	**24.4657**	**10.3599**	**4.8270**	**14.8186**	**0.0000**	**29,057.6394**	**29,057.6394**	**1.9450**	**0.0000**	**29,098.4835**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	8.0759	5.2000e-004	0.0544	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		0.1145	0.1145	3.2000e-004		0.1212
Energy	0.0940	0.8548	0.7180	5.1300e-003		0.0650	0.0650		0.0650	0.0650		1,025.7325	1,025.7325	0.0197	0.0188	1,031.9749
Mobile	3.9497	12.0814	40.4029	0.0788	4.2870	0.1697	4.4568	1.1491	0.1561	1.3052		6,888.6770	6,888.6770	0.2142		6,893.1757
Offroad	0.2109	1.8264	1.2491	1.5300e-003		0.1507	0.1507		0.1386	0.1386		156.2548	156.2548	0.0479		157.2602
Total	**12.3305**	**14.7631**	**42.4244**	**0.0855**	**4.2870**	**0.3856**	**4.6726**	**1.1491**	**0.3599**	**1.5090**		**8,070.7787**	**8,070.7787**	**0.2821**	**0.0188**	**8,082.5320**

2.2 Overall Operational

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Area	8.0759	5.2000e-004	0.0544	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		0.1145	0.1145	3.2000e-004		0.1212
Energy	0.0940	0.8548	0.7180	5.1300e-003		0.0650	0.0650		0.0650	0.0650		1,025.7325	1,025.7325	0.0197	0.0188	1,031.9749
Mobile	3.9497	12.0814	40.4029	0.0788	4.2870	0.1697	4.4568	1.1491	0.1561	1.3052		6,888.6770	6,888.6770	0.2142		6,893.1757
Offroad	0.2109	1.8264	1.2491	1.5300e-003		0.1507	0.1507		0.1386	0.1386		156.2548	156.2548	0.0479		157.2602
Total	**12.3305**	**14.7631**	**42.4244**	**0.0855**	**4.2870**	**0.3856**	**4.6726**	**1.1491**	**0.3599**	**1.5090**		**8,070.7787**	**8,070.7787**	**0.2821**	**0.0188**	**8,082.5320**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**1.71**	**12.37**	**2.94**	**1.79**	**0.00**	**39.08**	**3.22**	**0.00**	**38.52**	**9.19**	**0.00**	**1.94**	**1.94**	**16.97**	**0.00**	**1.95**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Demolition	Demolition	1/1/2016	1/28/2016	5	20	
2	Site Preparation	Site Preparation	1/29/2016	2/11/2016	5	10	
3	Grading	Grading	2/12/2016	3/10/2016	5	20	
4	Building Construction	Building Construction	3/11/2016	1/26/2017	5	230	
5	Paving	Paving	1/27/2017	2/23/2017	5	20	
6	Architectural Coating	Architectural Coating	2/24/2017	3/23/2017	5	20	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 10

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 328,044; Non-Residential Outdoor: 109,348 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Demolition	Concrete/Industrial Saws	1	8.00	81	0.73
Demolition	Excavators	3	8.00	162	0.38
Demolition	Rubber Tired Dozers	2	8.00	255	0.40
Site Preparation	Rubber Tired Dozers	3	8.00	255	0.40
Site Preparation	Tractors/Loaders/Backhoes	4	8.00	97	0.37
Grading	Excavators	1	8.00	162	0.38
Grading	Graders	1	8.00	174	0.41
Grading	Rubber Tired Dozers	1	8.00	255	0.40
Grading	Tractors/Loaders/Backhoes	3	8.00	97	0.37
Building Construction	Cranes	1	7.00	226	0.29
Building Construction	Forklifts	3	8.00	89	0.20
Building Construction	Generator Sets	1	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	3	7.00	97	0.37
Building Construction	Welders	1	8.00	46	0.45
Paving	Pavers	2	8.00	125	0.42
Paving	Paving Equipment	2	8.00	130	0.36
Paving	Rollers	2	8.00	80	0.38
Architectural Coating	Air Compressors	1	6.00	78	0.48

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Demolition	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Site Preparation	7	18.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Grading	6	15.00	0.00	5,534.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Building Construction	9	131.00	55.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Paving	6	15.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Architectural Coating	1	26.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Demolition - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365		4,089.284 1	4,089.284 1	1.1121		4,112.637 4
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**		**2.2921**	**2.2921**		**2.1365**	**2.1365**		**4,089.284 1**	**4,089.284 1**	**1.1121**		**4,112.637 4**

3.2 Demolition - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0671	0.0663	0.8045	1.5900e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0335		129.8511	129.8511	6.4400e-003		129.9864
Total	**0.0671**	**0.0663**	**0.8045**	**1.5900e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0335**		**129.8511**	**129.8511**	**6.4400e-003**		**129.9864**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.2876	45.6559	35.0303	0.0399		2.2921	2.2921		2.1365	2.1365	0.0000	4,089.2841	4,089.2841	1.1121		4,112.6374
Total	**4.2876**	**45.6559**	**35.0303**	**0.0399**		**2.2921**	**2.2921**		**2.1365**	**2.1365**	**0.0000**	**4,089.2841**	**4,089.2841**	**1.1121**		**4,112.6374**

3.2 Demolition - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0671	0.0663	0.8045	1.5900e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0335		129.8511	129.8511	6.4400e-003		129.9864
Total	**0.0671**	**0.0663**	**0.8045**	**1.5900e-003**	**0.1232**	**9.4000e-004**	**0.1242**	**0.0327**	**8.6000e-004**	**0.0335**		**129.8511**	**129.8511**	**6.4400e-003**		**129.9864**

3.3 Site Preparation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036		4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**		**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.3 Site Preparation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0806	0.0795	0.9654	1.9000e-003	0.1479	1.1300e-003	0.1490	0.0392	1.0300e-003	0.0403		155.8213	155.8213	7.7300e-003		155.9836
Total	**0.0806**	**0.0795**	**0.9654**	**1.9000e-003**	**0.1479**	**1.1300e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**155.8213**	**155.8213**	**7.7300e-003**		**155.9836**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					18.0663	0.0000	18.0663	9.9307	0.0000	9.9307			0.0000			0.0000
Off-Road	5.0771	54.6323	41.1053	0.0391		2.9387	2.9387		2.7036	2.7036	0.0000	4,065.0053	4,065.0053	1.2262		4,090.7544
Total	**5.0771**	**54.6323**	**41.1053**	**0.0391**	**18.0663**	**2.9387**	**21.0049**	**9.9307**	**2.7036**	**12.6343**	**0.0000**	**4,065.0053**	**4,065.0053**	**1.2262**		**4,090.7544**

3.3 Site Preparation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0806	0.0795	0.9654	1.9000e-003	0.1479	1.1300e-003	0.1490	0.0392	1.0300e-003	0.0403		155.8213	155.8213	7.7300e-003		155.9836
Total	**0.0806**	**0.0795**	**0.9654**	**1.9000e-003**	**0.1479**	**1.1300e-003**	**0.1490**	**0.0392**	**1.0300e-003**	**0.0403**		**155.8213**	**155.8213**	**7.7300e-003**		**155.9836**

3.4 Grading - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8790	0.0000	6.8790	3.4170	0.0000	3.4170			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225		3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**6.8790**	**2.1984**	**9.0774**	**3.4170**	**2.0225**	**5.4395**		**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.4 Grading - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0878	70.3956	63.4938	0.2067	4.8471	1.1412	5.9883	1.3293	1.0495	2.3788		20,815.7386	20,815.7386	0.1541		20,818.9749
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0671	0.0663	0.8045	1.5900e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0335		129.8511	129.8511	6.4400e-003		129.9864
Total	**6.1550**	**70.4619**	**64.2982**	**0.2082**	**4.9703**	**1.1422**	**6.1125**	**1.3620**	**1.0503**	**2.4123**		**20,945.5897**	**20,945.5897**	**0.1606**		**20,948.9613**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.8790	0.0000	6.8790	3.4170	0.0000	3.4170			0.0000			0.0000
Off-Road	3.6669	38.4466	26.0787	0.0298		2.1984	2.1984		2.0225	2.0225	0.0000	3,093.7889	3,093.7889	0.9332		3,113.3860
Total	**3.6669**	**38.4466**	**26.0787**	**0.0298**	**6.8790**	**2.1984**	**9.0774**	**3.4170**	**2.0225**	**5.4395**	**0.0000**	**3,093.7889**	**3,093.7889**	**0.9332**		**3,113.3860**

3.4 Grading - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	6.0878	70.3956	63.4938	0.2067	4.8471	1.1412	5.9883	1.3293	1.0495	2.3788		20,815.7386	20,815.7386	0.1541		20,818.9749
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0671	0.0663	0.8045	1.5900e-003	0.1232	9.4000e-004	0.1242	0.0327	8.6000e-004	0.0335		129.8511	129.8511	6.4400e-003		129.9864
Total	**6.1550**	**70.4619**	**64.2982**	**0.2082**	**4.9703**	**1.1422**	**6.1125**	**1.3620**	**1.0503**	**2.4123**		**20,945.5897**	**20,945.5897**	**0.1606**		**20,948.9613**

3.5 Building Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485		2,669.2864	2,669.2864	0.6620		2,683.1890
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**		**2,669.2864**	**2,669.2864**	**0.6620**		**2,683.1890**

3.5 Building Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6858	5.2945	7.1716	0.0131	0.3661	0.0958	0.4619	0.1045	0.0881	0.1926		1,311.908 9	1,311.908 9	0.0113		1,312.145 8
Worker	0.5862	0.5787	7.0257	0.0139	1.0761	8.2000e-003	1.0843	0.2854	7.5100e-003	0.2930		1,134.032 7	1,134.032 7	0.0563		1,135.214 2
Total	**1.2720**	**5.8732**	**14.1973**	**0.0270**	**1.4422**	**0.1040**	**1.5462**	**0.3900**	**0.0956**	**0.4855**		**2,445.941 6**	**2,445.941 6**	**0.0675**		**2,447.360 0**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.4062	28.5063	18.5066	0.0268		1.9674	1.9674		1.8485	1.8485	0.0000	2,669.286 4	2,669.286 4	0.6620		2,683.189 0
Total	**3.4062**	**28.5063**	**18.5066**	**0.0268**		**1.9674**	**1.9674**		**1.8485**	**1.8485**	**0.0000**	**2,669.286 4**	**2,669.286 4**	**0.6620**		**2,683.189 0**

3.5 Building Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.6858	5.2945	7.1716	0.0131	0.3661	0.0958	0.4619	0.1045	0.0881	0.1926		1,311.908 9	1,311.908 9	0.0113		1,312.145 8
Worker	0.5862	0.5787	7.0257	0.0139	1.0761	8.2000e-003	1.0843	0.2854	7.5100e-003	0.2930		1,134.032 7	1,134.032 7	0.0563		1,135.214 2
Total	**1.2720**	**5.8732**	**14.1973**	**0.0270**	**1.4422**	**0.1040**	**1.5462**	**0.3900**	**0.0956**	**0.4855**		**2,445.941 6**	**2,445.941 6**	**0.0675**		**2,447.360 0**

3.5 Building Construction - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730		2,639.805 3	2,639.805 3	0.6497		2,653.449 0
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**		**2,639.805 3**	**2,639.805 3**	**0.6497**		**2,653.449 0**

3.5 Building Construction - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5949	4.6711	6.4140	0.0131	0.3661	0.0804	0.4466	0.1045	0.0739	0.1785		1,289.4685	1,289.4685	0.0104		1,289.6878
Worker	0.5149	0.5124	6.1803	0.0139	1.0761	7.8400e-003	1.0840	0.2854	7.2100e-003	0.2927		1,088.9870	1,088.9870	0.0509		1,090.0566
Total	**1.1097**	**5.1834**	**12.5942**	**0.0269**	**1.4423**	**0.0883**	**1.5305**	**0.3900**	**0.0811**	**0.4711**		**2,378.4555**	**2,378.4555**	**0.0614**		**2,379.7444**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.1024	26.4057	18.1291	0.0268		1.7812	1.7812		1.6730	1.6730	0.0000	2,639.8053	2,639.8053	0.6497		2,653.4490
Total	**3.1024**	**26.4057**	**18.1291**	**0.0268**		**1.7812**	**1.7812**		**1.6730**	**1.6730**	**0.0000**	**2,639.8053**	**2,639.8053**	**0.6497**		**2,653.4490**

3.5 Building Construction - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.5949	4.6711	6.4140	0.0131	0.3661	0.0804	0.4466	0.1045	0.0739	0.1785		1,289.468 5	1,289.468 5	0.0104		1,289.687 8
Worker	0.5149	0.5124	6.1803	0.0139	1.0761	7.8400e-003	1.0840	0.2854	7.2100e-003	0.2927		1,088.987 0	1,088.987 0	0.0509		1,090.056 6
Total	**1.1097**	**5.1834**	**12.5942**	**0.0269**	**1.4423**	**0.0883**	**1.5305**	**0.3900**	**0.0811**	**0.4711**		**2,378.455 5**	**2,378.455 5**	**0.0614**		**2,379.744 4**

3.6 Paving - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473		2,281.058 8	2,281.058 8	0.6989		2,295.736 0
Paving	0.3629					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2702**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**		**2,281.058 8**	**2,281.058 8**	**0.6989**		**2,295.736 0**

3.6 Paving - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0590	0.0587	0.7077	1.5900e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		124.6932	124.6932	5.8300e-003		124.8156
Total	**0.0590**	**0.0587**	**0.7077**	**1.5900e-003**	**0.1232**	**9.0000e-004**	**0.1241**	**0.0327**	**8.3000e-004**	**0.0335**		**124.6932**	**124.6932**	**5.8300e-003**		**124.8156**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.9074	20.2964	14.7270	0.0223		1.1384	1.1384		1.0473	1.0473	0.0000	2,281.0588	2,281.0588	0.6989		2,295.7360
Paving	0.3629					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**2.2702**	**20.2964**	**14.7270**	**0.0223**		**1.1384**	**1.1384**		**1.0473**	**1.0473**	**0.0000**	**2,281.0588**	**2,281.0588**	**0.6989**		**2,295.7360**

3.6 Paving - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0590	0.0587	0.7077	1.5900e-003	0.1232	9.0000e-004	0.1241	0.0327	8.3000e-004	0.0335		124.6932	124.6932	5.8300e-003		124.8156
Total	**0.0590**	**0.0587**	**0.7077**	**1.5900e-003**	**0.1232**	**9.0000e-004**	**0.1241**	**0.0327**	**8.3000e-004**	**0.0335**		**124.6932**	**124.6932**	**5.8300e-003**		**124.8156**

3.7 Architectural Coating - 2017

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	152.0484					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733		281.4481	281.4481	0.0297		282.0721
Total	**152.3807**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**		**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1022	0.1017	1.2266	2.7500e-003	0.2136	1.5600e-003	0.2151	0.0567	1.4300e-003	0.0581		216.1348	216.1348	0.0101		216.3471
Total	**0.1022**	**0.1017**	**1.2266**	**2.7500e-003**	**0.2136**	**1.5600e-003**	**0.2151**	**0.0567**	**1.4300e-003**	**0.0581**		**216.1348**	**216.1348**	**0.0101**		**216.3471**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	152.0484					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.3323	2.1850	1.8681	2.9700e-003		0.1733	0.1733		0.1733	0.1733	0.0000	281.4481	281.4481	0.0297		282.0721
Total	**152.3807**	**2.1850**	**1.8681**	**2.9700e-003**		**0.1733**	**0.1733**		**0.1733**	**0.1733**	**0.0000**	**281.4481**	**281.4481**	**0.0297**		**282.0721**

3.7 Architectural Coating - 2017

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.1022	0.1017	1.2266	2.7500e-003	0.2136	1.5600e-003	0.2151	0.0567	1.4300e-003	0.0581		216.1348	216.1348	0.0101		216.3471
Total	**0.1022**	**0.1017**	**1.2266**	**2.7500e-003**	**0.2136**	**1.5600e-003**	**0.2151**	**0.0567**	**1.4300e-003**	**0.0581**		**216.1348**	**216.1348**	**0.0101**		**216.3471**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Unmitigated	3.9497	12.0814	40.4029	0.0788	4.2870	0.1697	4.4568	1.1491	0.1561	1.3052		6,888.6770	6,888.6770	0.2142		6,893.1757
Mitigated	3.9497	12.0814	40.4029	0.0788	4.2870	0.1697	4.4568	1.1491	0.1561	1.3052		6,888.6770	6,888.6770	0.2142		6,893.1757

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
General Heavy Industry	0.00	0.00	0.00		
General Light Industry	0.00	0.00	0.00		
Government Office Building	0.00	0.00	0.00		
Parking Lot	0.00	0.00	0.00		
Research & Development	500.08	500.08	0.00	1,074,278	1,074,278
Research & Development	297.04	297.04	0.00	638,105	638,105
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Unrefrigerated Warehouse-No Rail	0.00	0.00	0.00		
Total	797.12	797.12	0.00	1,712,383	1,712,383

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
General Heavy Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
General Light Industry	9.50	7.30	7.30	59.00	28.00	13.00	92	5	3
Government Office Building	9.50	7.30	7.30	33.00	62.00	5.00	50	34	16
Parking Lot	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Research & Development	9.50	7.30	7.30	33.00	48.00	19.00	82	15	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3
Unrefrigerated Warehouse-No	9.50	7.30	7.30	59.00	0.00	41.00	92	5	3

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.411941	0.062653	0.156059	0.175861	0.050938	0.007827	0.019365	0.102312	0.001797	0.001584	0.006425	0.000939	0.002301

4.4 Fleet Mix

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0940	0.8548	0.7180	5.1300e-003		0.0650	0.0650		0.0650	0.0650		1,025.7325	1,025.7325	0.0197	0.0188	1,031.9749
NaturalGas Unmitigated	0.0940	0.8548	0.7180	5.1300e-003		0.0650	0.0650		0.0650	0.0650		1,025.7325	1,025.7325	0.0197	0.0188	1,031.9749

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Government Office Building	118.493	1.2800e-003	0.0116	9.7600e-003	7.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		13.9404	13.9404	2.7000e-004	2.6000e-004	14.0252
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	2122.18	0.0229	0.2081	0.1748	1.2500e-003		0.0158	0.0158		0.0158	0.0158		249.6680	249.6680	4.7900e-003	4.5800e-003	251.1875
Research & Development	3572.78	0.0385	0.3503	0.2942	2.1000e-003		0.0266	0.0266		0.0266	0.0266		420.3272	420.3272	8.0600e-003	7.7100e-003	422.8852
Unrefrigerated Warehouse-No Rail	1056.99	0.0114	0.1036	0.0871	6.2000e-004		7.8800e-003	7.8800e-003		7.8800e-003	7.8800e-003		124.3513	124.3513	2.3800e-003	2.2800e-003	125.1081
Unrefrigerated Warehouse-No Rail	317.096	3.4200e-003	0.0311	0.0261	1.9000e-004		2.3600e-003	2.3600e-003		2.3600e-003	2.3600e-003		37.3054	37.3054	7.2000e-004	6.8000e-004	37.5324
General Heavy Industry	322.356	3.4800e-003	0.0316	0.0266	1.9000e-004		2.4000e-003	2.4000e-003		2.4000e-003	2.4000e-003		37.9243	37.9243	7.3000e-004	7.0000e-004	38.1551
General Light Industry	1208.84	0.0130	0.1185	0.0996	7.1000e-004		9.0100e-003	9.0100e-003		9.0100e-003	9.0100e-003		142.2160	142.2160	2.7300e-003	2.6100e-003	143.0815
Total		**0.0940**	**0.8548**	**0.7180**	**5.1300e-003**		**0.0650**	**0.0650**		**0.0650**	**0.0650**		**1,025.7325**	**1,025.7325**	**0.0197**	**0.0188**	**1,031.9749**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Government Office Building	0.118493	1.2800e-003	0.0116	9.7600e-003	7.0000e-005		8.8000e-004	8.8000e-004		8.8000e-004	8.8000e-004		13.9404	13.9404	2.7000e-004	2.6000e-004	14.0252
Parking Lot	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Research & Development	2.12218	0.0229	0.2081	0.1748	1.2500e-003		0.0158	0.0158		0.0158	0.0158		249.6680	249.6680	4.7900e-003	4.5800e-003	251.1875
Research & Development	3.57278	0.0385	0.3503	0.2942	2.1000e-003		0.0266	0.0266		0.0266	0.0266		420.3272	420.3272	8.0600e-003	7.7100e-003	422.8852
Unrefrigerated Warehouse-No Rail	0.317096	3.4200e-003	0.0311	0.0261	1.9000e-004		2.3600e-003	2.3600e-003		2.3600e-003	2.3600e-003		37.3054	37.3054	7.2000e-004	6.8000e-004	37.5324
Unrefrigerated Warehouse-No Rail	1.05699	0.0114	0.1036	0.0871	6.2000e-004		7.8800e-003	7.8800e-003		7.8800e-003	7.8800e-003		124.3513	124.3513	2.3800e-003	2.2800e-003	125.1081
General Heavy Industry	0.322356	3.4800e-003	0.0316	0.0266	1.9000e-004		2.4000e-003	2.4000e-003		2.4000e-003	2.4000e-003		37.9243	37.9243	7.3000e-004	7.0000e-004	38.1551
General Light Industry	1.20884	0.0130	0.1185	0.0996	7.1000e-004		9.0100e-003	9.0100e-003		9.0100e-003	9.0100e-003		142.2160	142.2160	2.7300e-003	2.6100e-003	143.0815
Total		**0.0940**	**0.8548**	**0.7180**	**5.1300e-003**		**0.0650**	**0.0650**		**0.0650**	**0.0650**		**1,025.7325**	**1,025.7325**	**0.0197**	**0.0188**	**1,031.9749**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	8.0759	5.2000e-004	0.0544	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		0.1145	0.1145	3.2000e-004		0.1212
Unmitigated	8.0759	5.2000e-004	0.0544	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		0.1145	0.1145	3.2000e-004		0.1212

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.8331					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.2375					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.2500e-003	5.2000e-004	0.0544	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		0.1145	0.1145	3.2000e-004		0.1212
Total	**8.0759**	**5.2000e-004**	**0.0544**	**0.0000**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**		**0.1145**	**0.1145**	**3.2000e-004**		**0.1212**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.8331					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	7.2375					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	5.2500e-003	5.2000e-004	0.0544	0.0000		2.0000e-004	2.0000e-004		2.0000e-004	2.0000e-004		0.1145	0.1145	3.2000e-004		0.1212
Total	**8.0759**	**5.2000e-004**	**0.0544**	**0.0000**		**2.0000e-004**	**2.0000e-004**		**2.0000e-004**	**2.0000e-004**		**0.1145**	**0.1145**	**3.2000e-004**		**0.1212**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type
Forklifts	1	8.00	260	89	0.20	Diesel

UnMitigated/Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Equipment Type	lb/day										lb/day					
Forklifts	0.2109	1.8264	1.2491	1.5300e-003		0.1507	0.1507		0.1386	0.1386		156.2548	156.2548	0.0479		157.2602
Total	**0.2109**	**1.8264**	**1.2491**	**1.5300e-003**		**0.1507**	**0.1507**		**0.1386**	**0.1386**		**156.2548**	**156.2548**	**0.0479**		**157.2602**

10.0 Vegetation

Ryde Ave marina

San Joaquin Valley Air Basin, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	2			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined land use to represent marina work in channel at Rio Vista. This run is for construction only.

Construction Phase - Construction schedule from Moffatt & Nichol. Conservatively assume 2016 dates.

Off-road Equipment - Tug represented as other material with hp 400, pile driving 350 hp other construction, work skiff other general industrial 400 hp

Off-road Equipment - General industrial = work skiff 400 hp

Off-road Equipment - Other general industrial= work skiff 400 hp

Off-road Equipment - Other construction = pile driver 350 hp
Other material = tug 400 hp
Other general industrial = skiff 400 hp

Demolition -

Grading -

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	250
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	150	250
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	150	250
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	150	250
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	135.00
tblConstructionPhase	PhaseStartDate	1/30/2016	2/1/2016
tblConstructionPhase	PhaseStartDate	2/27/2016	2/29/2016
tblGrading	AcresOfGrading	135.00	0.00
tblGrading	MaterialExported	0.00	90,000.00
tblGrading	MaterialImported	0.00	1,600.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	LoadFactor	0.48	0.48
tblOffRoadEquipment	OffRoadEquipmentType		Scrapers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblWaterMitigation	Evapotranspiration	53.04584	49.927619

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4530	5.2332	3.9939	7.7300e-003	0.5174	0.1844	0.7018	0.2530	0.1701	0.4231	0.0000	713.8213	713.8213	0.0973	0.0000	715.8647
Total	**0.4530**	**5.2332**	**3.9939**	**7.7300e-003**	**0.5174**	**0.1844**	**0.7018**	**0.2530**	**0.1701**	**0.4231**	**0.0000**	**713.8213**	**713.8213**	**0.0973**	**0.0000**	**715.8647**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2016	0.4530	5.2332	3.9939	7.7300e-003	0.5174	0.1844	0.7018	0.2530	0.1701	0.4231	0.0000	713.8210	713.8210	0.0973	0.0000	715.8643
Total	**0.4530**	**5.2332**	**3.9939**	**7.7300e-003**	**0.5174**	**0.1844**	**0.7018**	**0.2530**	**0.1701**	**0.4231**	**0.0000**	**713.8210**	**713.8210**	**0.0973**	**0.0000**	**715.8643**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

2.2 Overall Operational

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Pile Driving	Trenching	1/4/2016	1/29/2016	5	20	
2	Float installation	Building Construction	2/1/2016	2/26/2016	5	20	
3	Excavation/rock slope protection	Grading	2/29/2016	9/2/2016	5	135	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation/rock slope protection	Scrapers	1	8.00	361	0.48
Pile Driving	Cranes	1	8.00	226	0.29
Pile Driving	Other Construction Equipment	1	8.00	350	0.42
Pile Driving	Other General Industrial Equipment	1	8.00	400	0.34
Pile Driving	Other Material Handling Equipment	1	8.00	400	0.40
Float installation	Air Compressors	1	8.00	78	0.48
Float installation	Cranes	1	8.00	226	0.29
Float installation	Forklifts	0	6.00	89	0.20
Float installation	Generator Sets	1	8.00	84	0.74
Float installation	Other General Industrial Equipment	1	8.00	87	0.34
Float installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Excavation/rock slope protection	Concrete/Industrial Saws	0	8.00	81	0.73
Excavation/rock slope protection	Excavators	1	8.00	162	0.38
Excavation/rock slope protection	Other General Industrial Equipment	1	8.00	400	0.34
Excavation/rock slope protection	Rubber Tired Dozers	1	8.00	255	0.40
Excavation/rock slope protection	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Pile Driving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Float installation	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/rock slope protection	4	10.00	0.00	11,450.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Pile Driving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0325	0.4053	0.1986	4.4000e-004		0.0160	0.0160		0.0147	0.0147	0.0000	41.2498	41.2498	0.0124	0.0000	41.5111
Total	**0.0325**	**0.4053**	**0.1986**	**4.4000e-004**		**0.0160**	**0.0160**		**0.0147**	**0.0147**	**0.0000**	**41.2498**	**41.2498**	**0.0124**	**0.0000**	**41.5111**

3.2 Pile Driving - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	4.8000e-004	4.7400e-003	1.0000e-005	8.0000e-004	1.0000e-005	8.1000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7165	0.7165	4.0000e-005	0.0000	0.7174
Total	**3.8000e-004**	**4.8000e-004**	**4.7400e-003**	**1.0000e-005**	**8.0000e-004**	**1.0000e-005**	**8.1000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7165**	**0.7165**	**4.0000e-005**	**0.0000**	**0.7174**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0325	0.4053	0.1986	4.4000e-004		0.0160	0.0160		0.0147	0.0147	0.0000	41.2498	41.2498	0.0124	0.0000	41.5111
Total	**0.0325**	**0.4053**	**0.1986**	**4.4000e-004**		**0.0160**	**0.0160**		**0.0147**	**0.0147**	**0.0000**	**41.2498**	**41.2498**	**0.0124**	**0.0000**	**41.5111**

3.2 Pile Driving - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	3.8000e-004	4.8000e-004	4.7400e-003	1.0000e-005	8.0000e-004	1.0000e-005	8.1000e-004	2.1000e-004	1.0000e-005	2.2000e-004	0.0000	0.7165	0.7165	4.0000e-005	0.0000	0.7174
Total	**3.8000e-004**	**4.8000e-004**	**4.7400e-003**	**1.0000e-005**	**8.0000e-004**	**1.0000e-005**	**8.1000e-004**	**2.1000e-004**	**1.0000e-005**	**2.2000e-004**	**0.0000**	**0.7165**	**0.7165**	**4.0000e-005**	**0.0000**	**0.7174**

3.3 Float installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0222	0.1974	0.1141	1.9000e-004		0.0126	0.0126		0.0121	0.0121	0.0000	16.7597	16.7597	3.2400e-003	0.0000	16.8278
Total	**0.0222**	**0.1974**	**0.1141**	**1.9000e-004**		**0.0126**	**0.0126**		**0.0121**	**0.0121**	**0.0000**	**16.7597**	**16.7597**	**3.2400e-003**	**0.0000**	**16.8278**

3.3 Float installation - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0222	0.1974	0.1141	1.9000e-004		0.0126	0.0126		0.0121	0.0121	0.0000	16.7597	16.7597	3.2400e-003	0.0000	16.8278
Total	**0.0222**	**0.1974**	**0.1141**	**1.9000e-004**		**0.0126**	**0.0126**		**0.0121**	**0.0121**	**0.0000**	**16.7597**	**16.7597**	**3.2400e-003**	**0.0000**	**16.8278**

3.3 Float installation - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

3.4 Excavation/rock slope protection - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4133	0.0000	0.4133	0.2245	0.0000	0.2245	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2589	3.1009	2.0700	2.7600e-003		0.1321	0.1321		0.1216	0.1216	0.0000	259.9346	259.9346	0.0784	0.0000	261.5811
Total	**0.2589**	**3.1009**	**2.0700**	**2.7600e-003**	**0.4133**	**0.1321**	**0.5454**	**0.2245**	**0.1216**	**0.3460**	**0.0000**	**259.9346**	**259.9346**	**0.0784**	**0.0000**	**261.5811**

3.4 Excavation/rock slope protection - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1364	1.5260	1.5745	4.2800e-003	0.0980	0.0236	0.1216	0.0269	0.0217	0.0487	0.0000	390.3240	390.3240	2.9100e-003	0.0000	390.3851
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5700e-003	3.2400e-003	0.0320	7.0000e-005	5.4000e-003	4.0000e-005	5.4400e-003	1.4300e-003	4.0000e-005	1.4700e-003	0.0000	4.8366	4.8366	2.6000e-004	0.0000	4.8421
Total	**0.1390**	**1.5293**	**1.6065**	**4.3500e-003**	**0.1034**	**0.0237**	**0.1270**	**0.0284**	**0.0218**	**0.0501**	**0.0000**	**395.1607**	**395.1607**	**3.1700e-003**	**0.0000**	**395.2273**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.4133	0.0000	0.4133	0.2245	0.0000	0.2245	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2589	3.1009	2.0700	2.7600e-003		0.1321	0.1321		0.1216	0.1216	0.0000	259.9343	259.9343	0.0784	0.0000	261.5808
Total	**0.2589**	**3.1009**	**2.0700**	**2.7600e-003**	**0.4133**	**0.1321**	**0.5454**	**0.2245**	**0.1216**	**0.3460**	**0.0000**	**259.9343**	**259.9343**	**0.0784**	**0.0000**	**261.5808**

3.4 Excavation/rock slope protection - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.1364	1.5260	1.5745	4.2800e-003	0.0980	0.0236	0.1216	0.0269	0.0217	0.0487	0.0000	390.3240	390.3240	2.9100e-003	0.0000	390.3851
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	2.5700e-003	3.2400e-003	0.0320	7.0000e-005	5.4000e-003	4.0000e-005	5.4400e-003	1.4300e-003	4.0000e-005	1.4700e-003	0.0000	4.8366	4.8366	2.6000e-004	0.0000	4.8421
Total	**0.1390**	**1.5293**	**1.6065**	**4.3500e-003**	**0.1034**	**0.0237**	**0.1270**	**0.0284**	**0.0218**	**0.0501**	**0.0000**	**395.1607**	**395.1607**	**3.1700e-003**	**0.0000**	**395.2273**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.411941	0.062653	0.156059	0.175861	0.050938	0.007827	0.019365	0.102312	0.001797	0.001584	0.006425	0.000939	0.002301

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Unmitigated	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	1.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	2.0000e-005	2.0000e-005	0.0000	0.0000	2.0000e-005
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**1.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**2.0000e-005**	**2.0000e-005**	**0.0000**	**0.0000**	**2.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

<u>Unmitigated</u>

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

7.2 Water by Land Use

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
User Defined Industrial	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Ryde Ave marina

San Joaquin Valley Air Basin, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
User Defined Industrial	1.00	User Defined Unit	0.00	0.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.7	**Precipitation Freq (Days)**	45
Climate Zone	2			**Operational Year**	2017
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	641.35	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use - User defined land use to represent marina work in channel at Rio Vista. This run is for construction only.

Construction Phase - Construction schedule from Moffatt & Nichol. Conservatively assume 2016 dates.

Off-road Equipment - Tug represented as other material with hp 400, pile driving 350 hp other construction, work skiff other general industrial 400 hp

Off-road Equipment - General industrial = work skiff 400 hp

Off-road Equipment - Other general industrial= work skiff 400 hp

Off-road Equipment - Other construction = pile driver 350 hp
Other material = tug 400 hp
Other general industrial = skiff 400 hp

Demolition -

Grading -

Vechicle Emission Factors -

Vechicle Emission Factors -

Vechicle Emission Factors -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_EF_Nonresidential_Exterior	150	250
tblAreaMitigation	UseLowVOCPaintNonresidentialInteriorValue	150	250
tblAreaMitigation	UseLowVOCPaintResidentialExteriorValue	150	250
tblAreaMitigation	UseLowVOCPaintResidentialInteriorValue	150	250
tblConstructionPhase	NumDays	0.00	20.00
tblConstructionPhase	NumDays	0.00	135.00
tblConstructionPhase	PhaseStartDate	1/30/2016	2/1/2016
tblConstructionPhase	PhaseStartDate	2/27/2016	2/29/2016
tblGrading	AcresOfGrading	135.00	0.00
tblGrading	MaterialExported	0.00	90,000.00
tblGrading	MaterialImported	0.00	1,600.00
tblOffRoadEquipment	HorsePower	171.00	350.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	87.00	400.00
tblOffRoadEquipment	HorsePower	167.00	400.00
tblOffRoadEquipment	LoadFactor	0.48	0.48
tblOffRoadEquipment	OffRoadEquipmentType		Scrapers
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	UsageHours	4.00	8.00
tblOffRoadEquipment	UsageHours	1.00	8.00
tblProjectCharacteristics	OperationalYear	2014	2017
tblWaterMitigation	Evapotranspiration	53.04584	49.927619

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.7470	67.5607	50.6649	0.1053	7.6901	2.3078	9.9979	3.7547	2.1230	5.8777	0.0000	10,711.9345	10,711.9345	1.3758	0.0000	10,740.8271
Total	**5.7470**	**67.5607**	**50.6649**	**0.1053**	**7.6901**	**2.3078**	**9.9979**	**3.7547**	**2.1230**	**5.8777**	**0.0000**	**10,711.9345**	**10,711.9345**	**1.3758**	**0.0000**	**10,740.8271**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2016	5.7470	67.5607	50.6649	0.1053	7.6901	2.3078	9.9979	3.7547	2.1230	5.8777	0.0000	10,711.9345	10,711.9345	1.3758	0.0000	10,740.8271
Total	**5.7470**	**67.5607**	**50.6649**	**0.1053**	**7.6901**	**2.3078**	**9.9979**	**3.7547**	**2.1230**	**5.8777**	**0.0000**	**10,711.9345**	**10,711.9345**	**1.3758**	**0.0000**	**10,740.8271**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**	**0.0000**	**2.3000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Pile Driving	Trenching	1/4/2016	1/29/2016	5	20	
2	Float installation	Building Construction	2/1/2016	2/26/2016	5	20	
3	Excavation/rock slope protection	Grading	2/29/2016	9/2/2016	5	135	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Excavation/rock slope protection	Scrapers	1	8.00	361	0.48
Pile Driving	Cranes	1	8.00	226	0.29
Pile Driving	Other Construction Equipment	1	8.00	350	0.42
Pile Driving	Other General Industrial Equipment	1	8.00	400	0.34
Pile Driving	Other Material Handling Equipment	1	8.00	400	0.40
Float installation	Air Compressors	1	8.00	78	0.48
Float installation	Cranes	1	8.00	226	0.29
Float installation	Forklifts	0	6.00	89	0.20
Float installation	Generator Sets	1	8.00	84	0.74
Float installation	Other General Industrial Equipment	1	8.00	87	0.34
Float installation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Excavation/rock slope protection	Concrete/Industrial Saws	0	8.00	81	0.73
Excavation/rock slope protection	Excavators	1	8.00	162	0.38
Excavation/rock slope protection	Other General Industrial Equipment	1	8.00	400	0.34
Excavation/rock slope protection	Rubber Tired Dozers	1	8.00	255	0.40
Excavation/rock slope protection	Tractors/Loaders/Backhoes	0	6.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Pile Driving	4	10.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Float installation	4	0.00	0.00	0.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT
Excavation/rock slope protection	4	10.00	0.00	11,450.00	10.80	7.30	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Pile Driving - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704		4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**		**1.5983**	**1.5983**		**1.4704**	**1.4704**		**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0448	0.0442	0.5363	1.0600e-003	0.0822	6.3000e-004	0.0828	0.0218	5.7000e-004	0.0224		86.5674	86.5674	4.2900e-003		86.6576
Total	**0.0448**	**0.0442**	**0.5363**	**1.0600e-003**	**0.0822**	**6.3000e-004**	**0.0828**	**0.0218**	**5.7000e-004**	**0.0224**		**86.5674**	**86.5674**	**4.2900e-003**		**86.6576**

3.2 Pile Driving - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.2483	40.5261	19.8643	0.0438		1.5983	1.5983		1.4704	1.4704	0.0000	4,547.0151	4,547.0151	1.3715		4,575.8175
Total	**3.2483**	**40.5261**	**19.8643**	**0.0438**		**1.5983**	**1.5983**		**1.4704**	**1.4704**	**0.0000**	**4,547.0151**	**4,547.0151**	**1.3715**		**4,575.8175**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0448	0.0442	0.5363	1.0600e-003	0.0822	6.3000e-004	0.0828	0.0218	5.7000e-004	0.0224		86.5674	86.5674	4.2900e-003		86.6576
Total	**0.0448**	**0.0442**	**0.5363**	**1.0600e-003**	**0.0822**	**6.3000e-004**	**0.0828**	**0.0218**	**5.7000e-004**	**0.0224**		**86.5674**	**86.5674**	**4.2900e-003**		**86.6576**

3.3 Float installation - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2237	19.7347	11.4103	0.0187		1.2582	1.2582		1.2056	1.2056		1,847.4420	1,847.4420	0.3574		1,854.9471
Total	**2.2237**	**19.7347**	**11.4103**	**0.0187**		**1.2582**	**1.2582**		**1.2056**	**1.2056**		**1,847.4420**	**1,847.4420**	**0.3574**		**1,854.9471**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.3 Float installation - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.2237	19.7347	11.4103	0.0187		1.2582	1.2582		1.2056	1.2056	0.0000	1,847.4420	1,847.4420	0.3574		1,854.9471
Total	**2.2237**	**19.7347**	**11.4103**	**0.0187**		**1.2582**	**1.2582**		**1.2056**	**1.2056**	**0.0000**	**1,847.4420**	**1,847.4420**	**0.3574**		**1,854.9471**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

3.4 Excavation/rock slope protection - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1222	0.0000	6.1222	3.3254	0.0000	3.3254			0.0000			0.0000
Off-Road	3.8362	45.9387	30.6663	0.0409		1.9573	1.9573		1.8008	1.8008		4,244.8720	4,244.8720	1.2804		4,271.7605
Total	**3.8362**	**45.9387**	**30.6663**	**0.0409**	**6.1222**	**1.9573**	**8.0796**	**3.3254**	**1.8008**	**5.1262**		**4,244.8720**	**4,244.8720**	**1.2804**		**4,271.7605**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.8661	21.5778	19.4623	0.0633	1.4857	0.3498	1.8356	0.4075	0.3217	0.7292		6,380.4952	6,380.4952	0.0472		6,381.4872
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0448	0.0442	0.5363	1.0600e-003	0.0822	6.3000e-004	0.0828	0.0218	5.7000e-004	0.0224		86.5674	86.5674	4.2900e-003		86.6576
Total	**1.9108**	**21.6220**	**19.9986**	**0.0644**	**1.5679**	**0.3504**	**1.9183**	**0.4293**	**0.3223**	**0.7515**		**6,467.0626**	**6,467.0626**	**0.0515**		**6,468.1447**

3.4 Excavation/rock slope protection - 2016

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					6.1222	0.0000	6.1222	3.3254	0.0000	3.3254			0.0000			0.0000
Off-Road	3.8362	45.9387	30.6663	0.0409		1.9573	1.9573		1.8008	1.8008	0.0000	4,244.8720	4,244.8720	1.2804		4,271.7605
Total	**3.8362**	**45.9387**	**30.6663**	**0.0409**	**6.1222**	**1.9573**	**8.0796**	**3.3254**	**1.8008**	**5.1262**	**0.0000**	**4,244.8720**	**4,244.8720**	**1.2804**		**4,271.7605**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.8661	21.5778	19.4623	0.0633	1.4857	0.3498	1.8356	0.4075	0.3217	0.7292		6,380.4952	6,380.4952	0.0472		6,381.4872
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0448	0.0442	0.5363	1.0600e-003	0.0822	6.3000e-004	0.0828	0.0218	5.7000e-004	0.0224		86.5674	86.5674	4.2900e-003		86.6576
Total	**1.9108**	**21.6220**	**19.9986**	**0.0644**	**1.5679**	**0.3504**	**1.9183**	**0.4293**	**0.3223**	**0.7515**		**6,467.0626**	**6,467.0626**	**0.0515**		**6,468.1447**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
User Defined Industrial	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
User Defined Industrial	9.50	7.30	7.30	0.00	0.00	0.00	0	0	0

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.411941	0.062653	0.156059	0.175861	0.050938	0.007827	0.019365	0.102312	0.001797	0.001584	0.006425	0.000939	0.002301

5.0 Energy Detail

4.4 Fleet Mix

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
User Defined Industrial	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Unmitigated	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Consumer Products	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.0000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.2000e-004	2.2000e-004	0.0000		2.3000e-004
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**1.0000e-005**	**0.0000**	**1.0000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.2000e-004**	**2.2000e-004**	**0.0000**		**2.3000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix E
BIOLOGICAL RESOURCES TECHNICAL APPENDIX

This appendix contains technical information related to biological resources at the Rio Vista Army Reserve Center (RVARC) site in Rio Vista and the 845 Ryde Avenue (Ryde Avenue) site in Stockton.

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United States Fish and Wildlife Service (USFWS) Endangered and Threatened Species List for the RVARC Site

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 141006121557

Current as of: October 6, 2014

Quad Lists

Listed Species

Invertebrates

Apodemia mormo langei
Lange's metalmark butterfly (E)

Branchinecta conservatio
Conservancy fairy shrimp (E)

Branchinecta lynchi
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Elaphrus viridis
Critical habitat, delta green ground beetle (X)
delta green ground beetle (T)

Lepidurus packardi
Critical habitat, vernal pool tadpole shrimp (X)
vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris
green sturgeon (T) (NMFS)

Hypomesus transpacificus
Critical habitat, delta smelt (X)
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

Rana draytonii
California red-legged frog (T)

Reptiles

Thamnophis gigas
giant garter snake (T)

Birds

Rallus longirostris obsoletus
California clapper rail (E)

Sternula antillarum (=Sterna, =albifrons) browni
California least tern (E)

Mammals

Reithrodontomys raviventris
salt marsh harvest mouse (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Cordylanthus mollis ssp. mollis
soft bird's-beak (E)

Erysimum capitatum ssp. angustatum
Contra Costa wallflower (E)
Critical Habitat, Contra Costa wallflower (X)

Lasthenia conjugens
Contra Costa goldfields (E)

Neostapfia colusana
Colusa grass (T)

Oenothera deltoides ssp. howellii
Antioch Dunes evening-primrose (E)
Critical habitat, Antioch Dunes evening-primrose (X)

Sidalcea keckii
Keck's checker-mallow (=checkerbloom) (E)

Tuctoria mucronata
Solano grass (=Crampton's tuctoria) (E)

Quads Containing Listed, Proposed or Candidate Species:

ISLETON (480A)
RIO VISTA (480B)
JERSEY ISLAND (480C)
BOULDIN ISLAND (480D)
BIRDS LANDING (481A)
ANTIOCH NORTH (481D)
LIBERTY ISLAND (497C)
COURTLAND (497D)
DOZIER (498D)

County Lists

Solano County

Listed Species

Invertebrates

Apodemia mormo langei
Lange's metalmark butterfly (E)

Branchinecta conservatio
Conservancy fairy shrimp (E)
Critical habitat, Conservancy fairy shrimp (X)

Branchinecta lynchi
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Elaphrus viridis
Critical habitat, delta green ground beetle (X)
delta green ground beetle (T)

Lepidurus packardi
Critical habitat, vernal pool tadpole shrimp (X)
vernal pool tadpole shrimp (E)

Speyeria callippe callippe
callippe silverspot butterfly (E)

Speyeria zerene myrtleae
Myrtle's silverspot butterfly (E)

Syncaris pacifica
California freshwater shrimp (E)

Fish

Acipenser medirostris
green sturgeon (T) (NMFS)

Eucyclogobius newberryi
tidewater goby (E)

Hypomesus transpacificus
Critical habitat, delta smelt (X)
delta smelt (T)

Oncorhynchus kisutch
coho salmon - central CA coast (E) (NMFS)

Oncorhynchus mykiss
Central California Coastal steelhead (T) (NMFS)
Central Valley steelhead (T) (NMFS)
Critical habitat, Central California coastal steelhead (X) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

Rana draytonii

California red-legged frog (T)
Critical habitat, California red-legged frog (X)

Reptiles

Masticophis lateralis euryxanthus
Alameda whipsnake [=striped racer] (T)
Critical habitat, Alameda whipsnake (X)

Thamnophis gigas
giant garter snake (T)

Birds

Charadrius alexandrinus nivosus
western snowy plover (T)

Pelecanus occidentalis californicus
California brown pelican (E)

Rallus longirostris obsoletus
California clapper rail (E)

Sternula antillarum (=Sterna, =albifrons) browni
California least tern (E)

Strix occidentalis caurina
northern spotted owl (T)

Mammals

Reithrodontomys raviventris
salt marsh harvest mouse (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Blennosperma bakeri
Baker's stickyseed [=Sonoma Sunshine] (E)

Castilleja affinis ssp. neglecta
Tiburon paintbrush (E)

Cirsium hydrophilum var. hydrophilum
Suisun thistle (E)

Cordylanthus mollis ssp. mollis
soft bird's-beak (E)

Erysimum capitatum ssp. angustatum
Contra Costa wallflower (E)
Critical Habitat, Contra Costa wallflower (X)

Holocarpha macradenia
Santa Cruz tarplant (T)

Lasthenia conjugens
Contra Costa goldfields (E)
Critical habitat, Contra Costa goldfields (X)

Limnanthes vinculans
Sebastopol meadowfoam (E)

Navarretia leucocephala ssp. pauciflora
few-flowered navarretia (E)

Neostapfia colusana
Colusa grass (T)
Critical habitat, Colusa grass (X)

Oenothera deltoides ssp. howellii
Antioch Dunes evening-primrose (E)
Critical habitat, Antioch Dunes evening-primrose (X)

Orcuttia inaequalis
San Joaquin Valley Orcutt grass (T)

Sidalcea keckii
Keck's checker-mallow (=checkerbloom) (E)

Trifolium amoenum
showy Indian clover (E)

Tuctoria mucronata
Critical habitat, Solano grass (=Crampton's tuctoria) (X)
Solano grass (=Crampton's tuctoria) (E)

Proposed Species

Amphibians

Anaxyrus canorus
Yosemite toad (PX)

Plants

Cirsium hydrophilum var. hydrophilum
Critical habitat, Suisun thistle (PX)

Cordylanthus mollis ssp. mollis
Critical habitat, soft bird's-beak (PX)

Key:

(E) *Endangered* - Listed as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.

Critical Habitat - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
(C) *Candidate* - Candidate to become a proposed species.
(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem.

However, we recommend that you get an updated list every 90 days. That would be January 04, 2015.

California Natural Diversity Database (CNDDB) Search Results for the RVARC Site

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Rio Vista (3812126) OR Dozier (3812137) OR Courtland (3812135) OR Liberty Island (3812136) OR Birds Landing (3812127) OR Isleton (3812125) OR Antioch North (3812117) OR Jersey Island (3812116) OR Bouldin Island (3812115))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	431	1	None	Endangered	G2G3	S1S2	null	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_EN-Endangered | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Freshwater marsh | Marsh & swamp | Swamp | Wetland
Ambystoma californiense	California tiger salamander	Amphibians	AAAAA01180	1116	10	Threatened	Threatened	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable	Cismontane woodland | Meadow & seep | Riparian woodland | Valley & foothill grassland | Vernal pool | Wetland
Andrena blennospermatis	Blennosperma vernal pool andrenid bee	Insects	IIHYM35030	15	2	None	None	G2	S2	null	null	Vernal pool
Anniella pulchra pulchra	silvery legless lizard	Reptiles	ARACC01012	94	5	None	None	G3G4T3T4Q	S3	null	CDFW_SSC-Species of Special Concern | USFS_S-Sensitive	Chaparral | Coastal dunes | Coastal scrub
Anthicus antiochensis	Antioch Dunes anthicid beetle	Insects	IICOL49020	6	2	None	None	G1	S1	null	null	Interior dunes
Anthicus sacramento	Sacramento anthicid beetle	Insects	IICOL49010	13	3	None	None	G1	S1	null	IUCN_EN-Endangered	Interior dunes
Apodemia mormo langei	Lange's metalmark butterfly	Insects	IILEPH7012	1	1	Endangered	None	G5T1	S1	null	XERCES_CI-Critically Imperiled	Interior dunes
Archoplites interruptus	Sacramento perch	Fish	AFCQB07010	5	1	None	None	G2G3	S1	null	AFS_TH-Threatened | CDFW_SSC-Species of Special Concern	Aquatic | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters
Ardea alba	great egret	Birds	ABNGA04040	35	1	None	None	G5	S4	null	CDF_S-Sensitive | IUCN_LC-Least Concern	Brackish marsh | Estuary | Freshwater marsh | Marsh & swamp | Riparian forest | Wetland
Ardea herodias	great blue heron	Birds	ABNGA04010	133	2	None	None	G5	S4	null	CDF_S-Sensitive | IUCN_LC-Least Concern	Brackish marsh | Estuary | Freshwater marsh | Marsh & swamp | Riparian forest | Wetland
Astragalus tener var. ferrisiae	Ferris' milk-vetch	Dicots	PDFAB0F8R3	18	1	None	None	G2T1	S1	1B.1	BLM_S-Sensitive	Meadow & seep | Valley & foothill grassland | Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	14	None	None	G2T2	S2	1B.2	null	Alkali playa | Valley & foothill grassland | Vernal pool | Wetland
											BLM_S-Sensitive | CDFW_SSC-	Coastal prairie |

Athene cunicularia	burrowing owl	Birds	ABNSB10010	1862	34	None	None	G4	S3	null	Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Coastal scrub | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	8	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub | Meadow & seep | Valley & foothill grassland
Atriplex depressa	brittlescale	Dicots	PDCHE042L0	61	3	None	None	G2	S2	1B.2	null	Alkali playa | Chenopod scrub | Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland
Atriplex persistens	vernal pool smallscale	Dicots	PDCHE042P0	41	3	None	None	G2	S2	1B.2	null	Vernal pool | Wetland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	48	3	None	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Branchinecta conservatio	Conservancy fairy shrimp	Crustaceans	ICBRA03010	42	8	Endangered	None	G1	S1	null	IUCN_EN-Endangered	Valley & foothill grassland | Vernal pool | Wetland
Branchinecta lynchi	vernal pool fairy shrimp	Crustaceans	ICBRA03030	751	17	Threatened	None	G3	S2S3	null	IUCN_VU-Vulnerable	Valley & foothill grassland | Vernal pool | Wetland
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	125	10	None	None	G2	S2	null	null	Vernal pool | Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	33	2	None	None	G5	S2	2B.3	null	Marsh & swamp | Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2394	97	None	Threatened	G5	S3	null	BLM_S-Sensitive | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin grassland | Riparian forest | Riparian woodland | Valley & foothill grassland
California macrophylla	round-leaved filaree	Dicots	PDGER01070	162	1	None	None	G2	S2	1B.1	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden | SB_SBBG-Santa Barbara Botanic Garden	Cismontane woodland | Valley & foothill grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	29	8	None	None	G5	S2	2B.1	null	Freshwater marsh | Marsh & swamp | Wetland
Centromadia parryi ssp. parryi	pappose tarplant	Dicots	PDAST4R0P2	29	2	None	None	G3T1	S1	1B.2	BLM_S-Sensitive	Coastal prairie | Marsh & swamp | Meadow & seep | Valley & foothill grassland
Charadrius montanus	mountain plover	Birds	ABNNB03100	88	4	None	None	G3	S2?	null	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_NT-Near Threatened | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Chenopod scrub | Valley & foothill grassland
Chloropyron molle ssp. molle	soft salty bird's-beak	Dicots	PDSCR0J0D2	27	1	Endangered	Rare	G2T1	S1	1B.2	null	Marsh & swamp | Salt marsh | Wetland
												Marsh & swamp |

Cicuta maculata var. bolanderi	Bolander's water-hemlock	Dicots	PDAPI0M051	17	5	None	None	G5T3T4	S2	2B.1	null	Salt marsh | Wetland
Coastal Brackish Marsh	Coastal Brackish Marsh	Marsh	CTT52200CA	30	2	None	None	G2	S2.1	null	null	Marsh & swamp | Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	6	None	None	G3	S2.1	null	null	Marsh & swamp | Wetland
Coelus gracilis	San Joaquin dune beetle	Insects	IICOL4A020	11	1	None	None	G1	S1	null	BLM_S-Sensitive | IUCN_VU-Vulnerable	Interior dunes
Cryptantha hooveri	Hoover's cryptantha	Dicots	PDBOR0A190	3	1	None	None	GH	SH	1A	null	Interior dunes | Valley & foothill grassland
Downingia pusilla	dwarf downingia	Dicots	PDCAM060C0	127	19	None	None	GU	S2	2B.2	null	Valley & foothill grassland | Vernal pool | Wetland
Efferia antiochi	Antioch efferian robberfly	Insects	IIDIP07010	4	1	None	None	G1G2	S1S2	null	null	Interior dunes
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	158	2	None	None	G5	S3S4	null	BLM_S-Sensitive | CDFW_FP-Fully Protected | IUCN_LC-Least Concern	Cismontane woodland | Marsh & swamp | Riparian woodland | Valley & foothill grassland | Wetland
Elaphrus viridis	Delta green ground beetle	Insects	IICOL36010	7	3	Threatened	None	G1	S1	null	IUCN_CR-Critically Endangered	Vernal pool | Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1137	26	None	None	G3G4	S3	null	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFS_S-Sensitive	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh & swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	Dicots	PDPGN0849Q	1	1	None	None	G5T1	S1	1B.1	null	Interior dunes
Eriogonum truncatum	Mt. Diablo buckwheat	Dicots	PDPGN085Z0	6	1	None	None	G2	S2	1B.1	null	Chaparral | Coastal scrub | Valley & foothill grassland
Erysimum capitatum var. angustatum	Contra Costa wallflower	Dicots	PDBRA16052	4	4	Endangered	Endangered	G5T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Interior dunes
Eschscholzia rhombipetala	diamond-petaled California poppy	Dicots	PDPAP0A0D0	10	1	None	None	G1	S1	1B.1	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Eucerceris ruficeps	redheaded sphecid wasp	Insects	IIHYM18010	3	1	None	None	G1G3	S1S2	null	null	Interior dunes
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	109	3	None	None	G2	S2	1B.2	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa | Chenopod scrub | Meadow & seep | Valley & foothill grassland
Fritillaria liliacea	fragrant fritillary	Monocots	PMLIL0V0C0	77	6	None	None	G2	S2	1B.2	USFS_S-Sensitive	Coastal prairie | Coastal scrub | Ultramafic | Valley & foothill grassland
											CDFW_SSC-Species of	

Geothlypis trichas sinuosa	saltmarsh common yellowthroat	Birds	ABPBX1201A	111	4	None	None	G5T2	S2	null	Special Concern | USFWS_BCC-Birds of Conservation Concern	Marsh & swamp
Gratiola heterosepala	Boggs Lake hedge-hyssop	Dicots	PDSCR0R060	94	6	None	Endangered	G2	S2	1B.2	BLM_S-Sensitive	Freshwater marsh | Marsh & swamp | Vernal pool | Wetland
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Dicots	PDMAL0H0R3	173	44	None	None	G5T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Freshwater marsh | Marsh & swamp | Wetland
Hydrochara rickseckeri	Ricksecker's water scavenger beetle	Insects	IICOL5V010	13	3	None	None	G2?	S2?	null	null	Aquatic | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters
Hygrotus curvipes	curved-foot hygrotus diving beetle	Insects	IICOL38030	21	1	None	None	G1	S1	null	null	Aquatic
Hypomesus transpacificus	Delta smelt	Fish	AFCHB01040	27	14	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened | IUCN_EN-Endangered	Aquatic | Estuary
Idiostatus middlekauffi	Middlekauff's shieldback katydid	Insects	IIORT31010	1	1	None	None	G1G2	S1	null	IUCN_CR-Critically Endangered	Interior dunes
Isocoma arguta	Carquinez goldenbush	Dicots	PDAST57050	14	6	None	None	G1	S1	1B.1	null	Valley & foothill grassland
Juglans hindsii	Northern California black walnut	Dicots	PDJUG02040	5	1	None	None	G1	S1	1B.1	SB_USDA-US Dept of Agriculture	Riparian forest | Riparian woodland
Lasiurus blossevillii	western red bat	Mammals	AMACC05060	119	5	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | WBWG_H-High Priority	Cismontane woodland | Lower montane coniferous forest | Riparian forest | Riparian woodland
Lasiurus cinereus	hoary bat	Mammals	AMACC05030	235	2	None	None	G5	S4	null	IUCN_LC-Least Concern | WBWG_M-Medium Priority	Broadleaved upland forest | Cismontane woodland | Lower montane coniferous forest | North coast coniferous forest
Lasthenia conjugens	Contra Costa goldfields	Dicots	PDAST5L040	33	1	Endangered	None	G1	S1	1B.1	null	Alkali playa | Cismontane woodland | Valley & foothill grassland | Vernal pool | Wetland
Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	241	10	None	Threatened	G3G4T1	S1	null	BLM_S-Sensitive | CDFW_FP-Fully Protected | IUCN_NT-Near Threatened | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Brackish marsh | Freshwater marsh | Marsh & swamp | Salt marsh | Wetland
Lathyrus jepsonii var. jepsonii	Delta tule pea	Dicots	PDFAB250D2	131	43	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank | SB_RSABG-Rancho Santa Ana Botanic Garden	Freshwater marsh | Marsh & swamp | Wetland
Legenere limosa	legenere	Dicots	PDCAM0C010	78	8	None	None	G2	S2	1B.1	BLM_S-Sensitive	Vernal pool | Wetland
Lepidium latipes var. heckardii	Heckard's pepper-grass	Dicots	PDBRA1M0K1	14	2	None	None	G4T2	S2	1B.2	null	Valley & foothill grassland
Lepidurus	vernal pool										IUCN_EN-	Valley & foothill grassland |

packardi	tadpole shrimp	Crustaceans	ICBRA10010	273	14	Endangered	None	G3	S2S3	null	Endangered	Vernal pool | Wetland
Lilaeopsis masonii	Mason's lilaeopsis	Dicots	PDAPI19030	197	104	None	Rare	G2	S2	1B.1	null	Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Limosella australis	Delta mudwort	Dicots	PDSCR10050	59	41	None	None	G4G5	S2	2B.1	null	Brackish marsh | Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	416	15	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Melospiza melodia	song sparrow ("Modesto" population)	Birds	ABPBXA3010	92	30	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern	null
Melospiza melodia maxillaris	Suisun song sparrow	Birds	ABPBXA301K	36	6	None	None	G5T2	S2	null	CDFW_SSC-Species of Special Concern | USFWS_BCC-Birds of Conservation Concern	Marsh & swamp | Wetland
Metapogon hurdi	Hurd's metapogon robberfly	Insects	IIDIP08010	3	1	None	None	G1G3	S1S3	null	null	Interior dunes
Myrmosula pacifica	Antioch multilid wasp	Insects	IIHYM15010	3	1	None	None	GH	SH	null	null	Interior dunes
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Dicots	PDPLM0C0E1	58	5	None	None	G4T2	S2	1B.1	BLM_S-Sensitive	Cismontane woodland | Lower montane coniferous forest | Meadow & seep | Valley & foothill grassland | Vernal pool | Wetland
Neostapfia colusana	Colusa grass	Monocots	PMPOA4C010	62	4	Threatened	Endangered	G2	S2	1B.1	null	Vernal pool | Wetland
Northern Claypan Vernal Pool	Northern Claypan Vernal Pool	Herbaceous	CTT44120CA	21	3	None	None	G1	S1.1	null	null	Vernal pool | Wetland
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Dicots	PDONA0C0B4	10	8	Endangered	Endangered	G5T1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Interior dunes
Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	2	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic | Sacramento/San Joaquin flowing waters
Perdita scitula antiochensis	Antioch andrenid bee	Insects	IIHYM01031	2	2	None	None	G1T1	S1	null	null	Interior dunes
Phalacrocorax auritus	double-crested cormorant	Birds	ABNFD01020	37	1	None	None	G5	S4	null	CDFW_WL-Watch List | IUCN_LC-Least Concern	Riparian forest | Riparian scrub | Riparian woodland
Philanthus nasalis	Antioch specid wasp	Insects	IIHYM20010	4	1	None	None	G1	S1	null	null	Interior dunes
Plagiobothrys hystriculus	bearded popcornflower	Dicots	PDBOR0V0H0	14	10	None	None	G2	S2	1B.1	null	Valley & foothill grassland | Vernal pool | Wetland
Pogonichthys macrolepidotus	Sacramento splittail	Fish	AFCJB34020	15	1	None	None	G2	S2	null	AFS_VU-Vulnerable | CDFW_SSC-Species of Special Concern | IUCN_EN-Endangered	Aquatic | Estuary | Freshwater marsh | Sacramento/San Joaquin flowing waters
Potamogeton zosteriformis	eel-grass pondweed	Monocots	PMPOT03160	9	1	None	None	G5	S3	2B.2	null	Marsh & swamp | Wetland
Reithrodontomys raviventris	salt-marsh harvest mouse	Mammals	AMAFF02040	133	7	Endangered	Endangered	G1G2	S1S2	null	CDFW_FP-Fully Protected | IUCN_EN-Endangered	Marsh & swamp | Wetland
Riparia riparia	bank swallow	Birds	ABPAU08010	296	1	None	Threatened	G5	S2	null	BLM_S-Sensitive | IUCN_LC-Least Concern	Riparian scrub | Riparian woodland

Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	93	10	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp | Wetland
Scutellaria galericulata	marsh skullcap	Dicots	PDLAM1U0J0	31	2	None	None	G5	S2	2B.2	null	Lower montane coniferous forest | Marsh & swamp | Meadow & seep | Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	3	None	None	G5	S1	2B.2	null	Marsh & swamp | Meadow & seep | Wetland
Sidalcea keckii	Keck's checkerbloom	Dicots	PDMAL110D0	16	2	Endangered	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Cismontane woodland | Valley & foothill grassland
Sphecodogastra antiochensis	Antioch Dunes halcitid bee	Insects	IIHYM78010	1	1	None	None	G1	S1	null	XERCES_CI-Critically Imperiled	Interior dunes
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	45	11	Candidate	Threatened	G5	S1	null	CDFW_SSC-Species of Special Concern	Aquatic | Estuary
Stabilized Interior Dunes	Stabilized Interior Dunes	Dune	CTT23100CA	2	1	None	None	G1	S1.1	null	null	Interior dunes
Symphyotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	173	98	None	None	G2	S2	1B.2	null	Brackish marsh | Freshwater marsh | Marsh & swamp | Wetland
Taxidea taxus	American badger	Mammals	AMAJF04010	476	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Alkali marsh | Alkali playa | Alpine | Alpine dwarf scrub | Bog & fen | Brackish marsh | Broadleaved upland forest | Chaparral | Chenopod scrub | Cismontane woodland | Closed-cone coniferous forest | Coastal bluff scrub | Coastal dunes | Coastal prairie | Coastal scrub | Desert dunes | Desert wash | Freshwater marsh | Great Basin grassland | Great Basin scrub | Interior dunes | Ione formation | Joshua tree woodland | Limestone | Lower montane coniferous forest | Marsh & swamp | Meadow & seep | Mojavean desert scrub | Montane dwarf scrub | North coast coniferous forest | Oldgrowth | Pavement plain | Redwood | Riparian forest | Riparian scrub | Riparian woodland | Salt marsh | Sonoran desert scrub | Sonoran thorn woodland | Ultramafic | Upper montane coniferous forest | Upper Sonoran scrub | Valley & foothill grassland
Thamnophis gigas	giant garter snake	Reptiles	ARADB36150	345	10	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp | Riparian scrub | Wetland
Trifolium												Marsh & swamp | Valley & foothill

hydrophilum	saline clover	Dicots	PDFAB400R5	49	1	None	None	G2	S2	1B.2	null	grassland | Vernal pool | Wetland
Tuctoria mucronata	Crampton's tuctoria or Solano grass	Monocots	PMPOA6N020	4	2	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Valley & foothill grassland | Vernal pool | Wetland
Valley Needlegrass Grassland	Valley Needlegrass Grassland	Herbaceous	CTT42110CA	45	2	None	None	G3	S3.1	null	null	Valley & foothill grassland

USFWS Endangered and Threatened Species List for the Ryde Avenue Site

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 141107052606

Current as of: November 7, 2014

Quad Lists

Listed Species

Invertebrates

Branchinecta lynchi
- vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
- valley elderberry longhorn beetle (T)

Lepidurus packardi
- vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris
- green sturgeon (T) (NMFS)

Hypomesus transpacificus
- Critical habitat, delta smelt (X)
- delta smelt (T)

Oncorhynchus mykiss
- Central Valley steelhead (T) (NMFS)
- Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
- Central Valley spring-run chinook salmon (T) (NMFS)
- winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
- California tiger salamander, central population (T)

Rana draytonii
- California red-legged frog (T)

Reptiles

Thamnophis gigas
- giant garter snake (T)

Mammals

Sylvilagus bachmani riparius
- riparian brush rabbit (E)

Plants

Castilleja campestris ssp. succulenta
- succulent (=fleshy) owl's-clover (T)

Cordylanthus palmatus
- palmate-bracted bird's-beak (E)

Quads Containing Listed, Proposed or Candidate Species:

STOCKTON EAST (461B)

MANTECA (461C)

STOCKTON WEST (462A)

HOLT (462B)
UNION ISLAND (462C)
LATHROP (462D)
WATERLOO (478C)
TERMINOUS (479C)
LODI SOUTH (479D)

County Lists

San Joaquin County

Listed Species

Invertebrates

Branchinecta conservatio
Conservancy fairy shrimp (E)
Critical habitat, Conservancy fairy shrimp (X)

Branchinecta longiantenna
longhorn fairy shrimp (E)

Branchinecta lynchi
Critical habitat, vernal pool fairy shrimp (X)
vernal pool fairy shrimp (T)

Desmocerus californicus dimorphus
valley elderberry longhorn beetle (T)

Elaphrus viridis
delta green ground beetle (T)

Lepidurus packardi
Critical habitat, vernal pool tadpole shrimp (X)
vernal pool tadpole shrimp (E)

Fish

Acipenser medirostris
green sturgeon (T) (NMFS)

Hypomesus transpacificus
Critical habitat, delta smelt (X)
delta smelt (T)

Oncorhynchus mykiss
Central Valley steelhead (T) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
Central Valley spring-run chinook salmon (T) (NMFS)
Critical Habitat, Central Valley spring-run chinook (X) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)
Critical habitat, CA tiger salamander, central population (X)

Rana draytonii
California red-legged frog (T)
Critical habitat, California red-legged frog (X)

Reptiles

Masticophis lateralis euryxanthus
Alameda whipsnake [=striped racer] (T)
Critical habitat, Alameda whipsnake (X)

Thamnophis gigas
giant garter snake (T)

Birds

Rallus longirostris obsoletus
California clapper rail (E)

Vireo bellii pusillus
Least Bell's vireo (E)

Mammals

Neotoma fuscipes riparia
riparian (San Joaquin Valley) woodrat (E)

Sylvilagus bachmani riparius
riparian brush rabbit (E)

Vulpes macrotis mutica
San Joaquin kit fox (E)

Plants

Amsinckia grandiflora
Critical habitat, large-flowered fiddleneck (X)
large-flowered fiddleneck (E)

Arctostaphylos myrtifolia
Ione manzanita (T)

Castilleja campestris ssp. succulenta
Critical habitat, succulent (=fleshy) owl's-clover (X)
succulent (=fleshy) owl's-clover (T)

Cordylanthus palmatus
palmate-bracted bird's-beak (E)

Lasthenia conjugens
Critical habitat, Contra Costa goldfields (X)

Orcuttia viscida

Critical habitat, Sacramento Orcutt grass (X)
Sacramento Orcutt grass (E)

Tuctoria greenei
Greene's tuctoria (=Orcutt grass) (E)

Candidate Species

Birds

Coccyzus americanus occidentalis
Western yellow-billed cuckoo (C)

Key:

(E) *Endangered* - Listed as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
Critical Habitat - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
(C) *Candidate* - Candidate to become a proposed species.
(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts. More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be February 05, 2015.

CNDDB Search Results for the Ryde Avenue Site

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE RareFind

Query Summary:
Quad IS (Terminous (3812114) OR Lodi South (3812113) OR Waterloo (3812112) OR Holt (3712184) OR Stockton West (3712183) OR Stockton East (3712182) OR Union Island (3712174) OR Lathrop (3712173) OR Manteca (3712172))

Print Close

CNDDB Element Query Results

Scientific Name	Common Name	Taxonomic Group	Element Code	Total Occs	Returned Occs	Federal Status	State Status	Global Rank	State Rank	CA Rare Plant Rank	Other Status	Habitats
Agelaius tricolor	tricolored blackbird	Birds	ABPBXB0020	431	5	None	Endangered	G2G3	S1S2	null	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_EN-Endangered | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Freshwater marsh | Marsh & swamp | Swamp | Wetland
Ambystoma californiense	California tiger salamander	Amphibians	AAAAA01180	1116	2	Threatened	Threatened	G2G3	S2S3	null	CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable	Cismontane woodland | Meadow & seep | Riparian woodland | Valley & foothill grassland | Vernal pool | Wetland
Astragalus tener var. tener	alkali milk-vetch	Dicots	PDFAB0F8R1	65	1	None	None	G2T2	S2	1B.2	null	Alkali playa | Valley & foothill grassland | Vernal pool | Wetland
Athene cunicularia	burrowing owl	Birds	ABNSB10010	1862	40	None	None	G4	S3	null	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Coastal prairie | Coastal scrub | Great Basin grassland | Great Basin scrub | Mojavean desert scrub | Sonoran desert scrub | Valley & foothill grassland
Atriplex cordulata var. cordulata	heartscale	Dicots	PDCHE040B0	66	1	None	None	G3T2	S2	1B.2	BLM_S-Sensitive	Chenopod scrub | Meadow & seep | Valley & foothill grassland
Blepharizonia plumosa	big tarplant	Dicots	PDAST1C011	48	2	None	None	G2	S2	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Valley & foothill grassland
Branchinecta mesovallensis	midvalley fairy shrimp	Crustaceans	ICBRA03150	125	2	None	None	G2	S2	null	null	Vernal pool | Wetland
Brasenia schreberi	watershield	Dicots	PDCAB01010	33	1	None	None	G5	S2	2B.3	null	Marsh & swamp | Wetland
Buteo swainsoni	Swainson's hawk	Birds	ABNKC19070	2394	239	None	Threatened	G5	S3	null	BLM_S-Sensitive | IUCN_LC-Least Concern | USFWS_BCC-Birds of Conservation Concern	Great Basin grassland | Riparian forest | Riparian woodland | Valley & foothill grassland
California macrophylla	round-leaved filaree	Dicots	PDGER01070	162	1	None	None	G2	S2	1B.1	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden |	Cismontane woodland | Valley & foothill

											SB_SBBG-Santa Barbara Botanic Garden	grassland
Carex comosa	bristly sedge	Monocots	PMCYP032Y0	29	1	None	None	G5	S2	2B.1	null	Freshwater marsh | Marsh & swamp | Wetland
Chloropyron palmatum	palmate-bracted salty bird's-beak	Dicots	PDSCR0J0J0	26	1	Endangered	Endangered	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden	Chenopod scrub | Meadow & seep | Valley & foothill grassland | Wetland
Cirsium crassicaule	slough thistle	Dicots	PDAST2E0U0	18	1	None	None	G2	S2	1B.1	BLM_S-Sensitive	Chenopod scrub | Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Coastal and Valley Freshwater Marsh	Coastal and Valley Freshwater Marsh	Marsh	CTT52410CA	60	7	None	None	G3	S2.1	null	null	Marsh & swamp | Wetland
Delphinium recurvatum	recurved larkspur	Dicots	PDRAN0B1J0	96	1	None	None	G3	S3	1B.2	BLM_S-Sensitive	Chenopod scrub | Cismontane woodland | Valley & foothill grassland
Desmocerus californicus dimorphus	valley elderberry longhorn beetle	Insects	IICOL48011	216	3	Threatened	None	G3T2	S2	null	null	Riparian scrub
Elanus leucurus	white-tailed kite	Birds	ABNKC06010	158	2	None	None	G5	S3S4	null	BLM_S-Sensitive | CDFW_FP-Fully Protected | IUCN_LC-Least Concern	Cismontane woodland | Marsh & swamp | Riparian woodland | Valley & foothill grassland | Wetland
Emys marmorata	western pond turtle	Reptiles	ARAAD02030	1137	8	None	None	G3G4	S3	null	BLM_S-Sensitive | CDFW_SSC-Species of Special Concern | IUCN_VU-Vulnerable | USFS_S-Sensitive	Aquatic | Artificial flowing waters | Klamath/North coast flowing waters | Klamath/North coast standing waters | Marsh & swamp | Sacramento/San Joaquin flowing waters | Sacramento/San Joaquin standing waters | South coast flowing waters | South coast standing waters | Wetland
Eryngium racemosum	Delta button-celery	Dicots	PDAPI0Z0S0	26	1	None	Endangered	G1Q	S1	1B.1	null	Riparian scrub | Wetland
Extriplex joaquinana	San Joaquin spearscale	Dicots	PDCHE041F3	109	1	None	None	G2	S2	1B.2	BLM_S-Sensitive | SB_RSABG-Rancho Santa Ana Botanic Garden	Alkali playa | Chenopod scrub | Meadow & seep | Valley & foothill grassland
Great Valley Valley Oak Riparian Forest	Great Valley Valley Oak Riparian Forest	Riparian	CTT61430CA	33	2	None	None	G1	S1.1	null	null	Riparian forest
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Dicots	PDMAL0H0R3	173	27	None	None	G5T2	S2	1B.2	SB_RSABG-Rancho Santa Ana Botanic Garden	Freshwater marsh | Marsh & swamp | Wetland
Hypomesus transpacificus	Delta smelt	Fish	AFCHB01040	27	3	Threatened	Endangered	G1	S1	null	AFS_TH-Threatened | IUCN_EN-Endangered	Aquatic | Estuary
											BLM_S-Sensitive | CDFW_FP-Fully Protected | IUCN_NT-	Brackish marsh |

Laterallus jamaicensis coturniculus	California black rail	Birds	ABNME03041	241	5	None	Threatened	G3G4T1	S1	null	Near Threatened | NABCI_RWL-Red Watch List | USFWS_BCC-Birds of Conservation Concern	Freshwater marsh | Marsh & swamp | Salt marsh | Wetland
Lathyrus jepsonii var. jepsonii	Delta tule pea	Dicots	PDFAB250D2	131	4	None	None	G5T2	S2	1B.2	SB_BerrySB-Berry Seed Bank | SB_RSABG-Rancho Santa Ana Botanic Garden	Freshwater marsh | Marsh & swamp | Wetland
Lepidurus packardi	vernal pool tadpole shrimp	Crustaceans	ICBRA10010	273	1	Endangered	None	G3	S2S3	null	IUCN_EN-Endangered	Valley & foothill grassland | Vernal pool | Wetland
Lilaeopsis masonii	Mason's lilaeopsis	Dicots	PDAPI19030	197	17	None	Rare	G2	S2	1B.1	null	Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Limosella australis	Delta mudwort	Dicots	PDSCR10050	59	4	None	None	G4G5	S2	2B.1	null	Brackish marsh | Freshwater marsh | Marsh & swamp | Riparian scrub | Wetland
Linderiella occidentalis	California linderiella	Crustaceans	ICBRA06010	416	1	None	None	G2G3	S2S3	null	IUCN_NT-Near Threatened	Vernal pool
Lytta moesta	moestan blister beetle	Insects	IICOL4C020	12	1	None	None	G2	S2	null	null	Valley & foothill grassland
Melospiza melodia	song sparrow ("Modesto" population)	Birds	ABPBXA3010	92	17	None	None	G5	S3?	null	CDFW_SSC-Species of Special Concern	null
Oncorhynchus mykiss irideus	steelhead - Central Valley DPS	Fish	AFCHA0209K	31	3	Threatened	None	G5T2Q	S2	null	AFS_TH-Threatened	Aquatic | Sacramento/San Joaquin flowing waters
Perognathus inornatus	San Joaquin Pocket Mouse	Mammals	AMAFD01060	111	1	None	None	G2G3	S2S3	null	BLM_S-Sensitive	Cismontane woodland | Mojavean desert scrub | Valley & foothill grassland
Sagittaria sanfordii	Sanford's arrowhead	Monocots	PMALI040Q0	93	2	None	None	G3	S3	1B.2	BLM_S-Sensitive	Marsh & swamp | Wetland
Scutellaria lateriflora	side-flowering skullcap	Dicots	PDLAM1U0Q0	13	2	None	None	G5	S1	2B.2	null	Marsh & swamp | Meadow & seep | Wetland
Spirinchus thaleichthys	longfin smelt	Fish	AFCHB03010	45	5	Candidate	Threatened	G5	S1	null	CDFW_SSC-Species of Special Concern	Aquatic | Estuary
Sylvilagus bachmani riparius	riparian brush rabbit	Mammals	AMAEB01021	16	12	Endangered	Endangered	G5T1	S1	null	null	Riparian forest
Symphyotrichum lentum	Suisun Marsh aster	Dicots	PDASTE8470	173	20	None	None	G2	S2	1B.2	null	Brackish marsh | Freshwater marsh | Marsh & swamp | Wetland
												Alkali marsh | Alkali playa | Alpine | Alpine dwarf scrub | Bog & fen | Brackish marsh | Broadleaved upland forest | Chaparral | Chenopod scrub | Cismontane woodland | Closed-cone coniferous forest | Coastal bluff scrub | Coastal dunes | Coastal prairie | Coastal scrub | Desert dunes | Desert wash | Freshwater marsh | Great

Taxidea taxus	American badger	Mammals	AMAJF04010	476	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Basin grassland | Great Basin scrub | Interior dunes | Ione formation | Joshua tree woodland | Limestone | Lower montane coniferous forest | Marsh & swamp | Meadow & seep | Mojavean desert scrub | Montane dwarf scrub | North coast coniferous forest | Oldgrowth | Pavement plain | Redwood | Riparian forest | Riparian scrub | Riparian woodland | Salt marsh | Sonoran desert scrub | Sonoran thorn woodland | Ultramafic | Upper montane coniferous forest | Upper Sonoran scrub | Valley & foothill grassland
Thamnophis gigas	giant garter snake	Reptiles	ARADB36150	345	6	Threatened	Threatened	G2	S2	null	IUCN_VU-Vulnerable	Marsh & swamp | Riparian scrub | Wetland
Trichocoronis wrightii var. wrightii	Wright's trichocoronis	Dicots	PDAST9F031	9	1	None	None	G4T3	S1	2B.1	null	Marsh & swamp | Meadow & seep | Riparian forest | Vernal pool | Wetland
Trifolium hydrophilum	saline clover	Dicots	PDFAB400R5	49	1	None	None	G2	S2	1B.2	null	Marsh & swamp | Valley & foothill grassland | Vernal pool | Wetland
Tropidocarpum capparideum	caper-fruited tropidocarpum	Dicots	PDBRA2R010	18	1	None	None	G1	S1	1B.1	SB_RSABG-Rancho Santa Ana Botanic Garden | USFS_S-Sensitive	Valley & foothill grassland
Valley Oak Woodland	Valley Oak Woodland	Woodland	CTT71130CA	91	1	None	None	G3	S2.1	null	null	Cismontane woodland
Vireo bellii pusillus	least Bell's vireo	Birds	ABPBW01114	467	1	Endangered	Endangered	G5T2	S2	null	IUCN_NT-Near Threatened | NABCI_YWL-Yellow Watch List	Riparian forest | Riparian scrub | Riparian woodland
Xanthocephalus xanthocephalus	yellow-headed blackbird	Birds	ABPBXB3010	11	1	None	None	G5	S3	null	CDFW_SSC-Species of Special Concern | IUCN_LC-Least Concern	Marsh & swamp | Wetland

RVARC Site Photographs

Rio Vista Army Reserve Center Site Photographs	Horizon WATER and ENVIRONMENT

Photo No. 1	**Date:** 9/16/14	
Description: Riparian woodland and freshwater marsh in the northern portion of the study area.		
Photo No. 2	**Date:** 9/16/14	
Description: Steep shoreline (foreground) and freshwater marsh (background) in the northern portion of the study area.		

Photo No. 3	**Date:** 5/7/14	
Description: Marine railway in the northern portion of the study area.		
Photo No. 4	**Date:** 5/7/14	
Description: Delta tule pea growing along the margins of the marine railway.		

Photo No. 5	**Date:** 9/16/14	
Description: Suisun Marsh aster growing on wood pier near marine railway.		
Photo No. 6	**Date:** 9/16/14	
Description: Typical conditions on the lower terrace.		

<table>
<tr><td>Photo No. 7</td><td>Date: 5/7/14</td><td rowspan="2"></td></tr>
<tr><td colspan="2">Description:
Conditions inside abandoned structure.</td></tr>
<tr><td>Photo No. 8</td><td>Date: 9/16/14</td><td rowspan="2"></td></tr>
<tr><td colspan="2">Description:
Typical conditions on the upper terrace.</td></tr>
</table>

Ryde Avenue Site Photographs

845 Ryde Avenue, Stockton Site Photographs	Horizon WATER and ENVIRONMENT

Photo No. 1	Date: 5/7/14	
Description: Typical conditions in the interior portion of the study area.		
Photo No. 2	**Date:** 5/7/14	
Description: Typical conditions in the interior portion of the study area.		

Photo No. 3	**Date:** 5/7/14
Description: Typical conditions along the shoreline of the study area.	

Photo No. 4	**Date:** 9/30/14
Description: Patch of emergent vegetation along shoreline of the study area.	

Photo No. 5	Date: 9/30/14	
Description: Conditions along eastern portion of the shoreline in the study area.		
Photo No. 6	**Date:** 9/30/14	
Description: Small patch of Suisun Marsh aster along the shoreline (center of the photo).		

RIO VISTA ARMY RESERVE CENTER REDEVELOPMENT PROJECT

Rio Vista, Solano County, CA

Bat Habitat Assessment and Building Survey

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June 5, 2015

RIO VISTA ARMY RESERVE CENTER REDEVELOPMENT PROJECT
Rio Vista, Solano County, CA

Bat Habitat Assessment and Building Survey

Contents

INTRODUCTION

The City of Rio Vista (City) is proposing to redevelop the 28.16-acre site of the former Rio Vista Army Reserve Center (RVARC). The City prepared an Environmental Impact Report (EIR) under the California Environmental Quality Act (CEQA) for the redevelopment of the site (City of Rio Vista 2010). Included in all issues addressed by the DEIR are potential impacts to biological resources, including two bat species. Prior to transfer of the property from the U.S. Government to the City, an Environmental Assessment (EA) was prepared which mentioned bat species with potential to occur on the site, but stated that a cursory examination of the buildings showed no signs of bats (U.S. Army Corps of Engineers 1999).

The California Department of Water Resources (DWR) and the U.S. Fish and Wildlife Service (USFWS) (collectively referred to as the Project Proponents) are planning the development of the Delta Research Station (DRS). The DRS is a proposed science and research center in the Delta. The planned DRS would consist of two facilities: an Estuarine Research Station (ERS) and a Fish Technology Center (FTC). DWR and USFWS are currently preparing a joint EIR and Environmental Impact Statement for development of the DRS. The RVARC is being considered as a potential location for the DRS.

Wildlife Research Associates was recently hired to conduct a daytime habitat assessment of all buildings and trees on the project site to identify suitable potential roost habitat for bats, and to recommend mitigation measures to prevent direct mortality resulting from project activities and/or compensation for loss of roost habitat.

PROJECT LOCATION AND SETTING

The RVARC is located on the west bank of the Sacramento River approximately 14 miles upstream of the Sacramento-San Joaquin River confluence, and is represented on the Rio Vista U.S. Geological Survey (USGS) 7.5' topographic quadrangle.

The property was used by the U.S. Army Corps of Engineers (USACE) between 1911 and 1952 as a storehouse, wharf and maintenance complex to support dredging and flood control activities in the area (City of Rio Vista 2010). Buildings were constructed starting in the 1920s, ending in the late 1940s (Ed Russell, personal communication). From 1952 to 1964, the facility was used as the Rio Vista Transportation Corps Marine Depot. In 1964, the Army transferred approximately 4 acres to the U.S. Coast Guard. In 1980, the remaining portion of the facility was redesignated as the Rio Vista Army Reserve Center. It was deactivated in 1989, formally closed in 1995, and transferred to the City in 2003, and annexed to the City in 2006.

There are 14 remaining buildings on the site, along with remnant concrete footings and foundations from previously removed buildings, a water tank, and marine railway. Matures trees are located around portions of the north and east boundaries and within the interior of the site, and some have died, becoming snags. A study on behalf of the City concluded that the buildings pose a blight, having been unmaintained for 25 years, and in poor condition.

BACKGROUND REGULATORY AND BIOLOGICAL INFORMATION

Regulatory Status

Bats are protected as non-game mammals in California under California Fish and Game Code. Ten species are classified as Species of Special Concern (SSC), and one species has been proposed for listing under the California Endangered Species Act (CESA) by the California Department of Fish and Wildlife (CDFW).

Typically, only special-status species are addressed in CEQA review and documentation. However, non-special-status bat species can often form maternity colonies large enough to be considered significant local breeding populations under CEQA. In addition, many bat species will roost together, including special-status bats that may form smaller colonies that are less easily detected or observed than their less rare cohorts.

Roosting Ecology
Twenty-five species of bats are known in California. Most are colonial and a few are solitary species that roost only in trees. Colonial bats are those that roost in groups of dozens to many thousands, and include Brazilian free-tailed bat (*Tadarida brasiliensis*), Yuma myotis (*Myotis yumanensis*), big brown bat (*Eptesicus fuscus*), and other *Myotis* species. Of the species that roost in man-made structures, these are the most likely to be found, although rarer bat species such as Townsend's big-eared bat (*Corynorhinus townsendii*), currently proposed in California for listing as Endangered or Threatened under CESA, and provided full protection during the ongoing listing review period, and pallid bat (*Antrozous pallidus*), a California SSC, will use man-made structures in certain circumstances.

Solitary, obligate tree-roosting bat species in this area are western red bat (*Lasiurus blossevillii*), a California SSC, and hoary bat (*Lasiurus cinereus*).

Seasonality of Roost Usage
Use of roosts by bats varies temporally and spatially throughout annual cycles as well as shorter, seasonal and daily cycles. Roost types are generally referred to as day roosts (used during breeding season by males and/or non-reproductive females), day maternity roosts (used for pup-rearing by females), night roosts (used by all volant bats during seasonal periods of bat activity, e.g. when foraging), dispersal roosts (where breeding occurs, or en route to winter roosts), and winter roosts (used either for hibernation or torpor).

Bats in this region of California are not actively flying year-round. During the maternity season, non-volant young of colonial bats remain in the roost until late summer (end of August), after which they may disperse from the natal roost or remain into or throughout the winter. During winter months, roosting bats typically enter torpor, rousing only occasionally to drink water or opportunistically feed on insects. The onset of torpor is dependent upon environmental conditions, primarily temperature and rainfall. To prevent direct mortality of either non-volant young or torpid bats during winter months, roosts should not be disturbed or destroyed until bats are seasonally active, and only after they have been provided a means of escape from the roost, generally through either humane bat eviction/exclusion, or partial dismantling of the structure under supervision and guidance of a qualified bat expert. See Recommendations for additional details.

Bats are considered "roost-limited", in that their survival depends on safe, protected roost sites during daylight hours. As a result, colonial bat species such as those that use man-made structures, are very site-faithful, and will use the same roost ad infinitum unless excluded or the roost is made unavailable to them.

METHODS

I conducted my habitat assessment on May 13, 2015. Weather was clear and windy, with temperatures warming from 63 F to 68 F throughout my survey. Upon arrival, I was met by Ed Russell, building inspector for the City of Rio Vista, who answered some general questions about the site.

I first conducted a visual survey and habitat assessment of all buildings by surveying the exteriors for any signs of entry by bats, followed by the interiors for any signs of past or present use, including fecal pellet accumulations, urine staining below roosts, fur staining at roost areas, audible vocalizations, characteristic odor, insect prey remains, and live or dead bats. I used 10 x 42 roof-prism binoculars, and a 275-Lumen flashlight as needed. A total of 14 buildings, plus a water tower, were surveyed. See Figure 1 for numbers assigned to buildings during my survey, as well as color-coding to show presence or absence of signs of bats per building.

Particular attention was given to detecting signs of special-status colonial bat species that could occur in the buildings, including Townsend's big-eared bat and pallid bat.

After completing surveys of the buildings, I assessed all trees on the site for suitable potential roost habitat, consisting of cavities, crevices and exfoliating bark for colonial species, and foliage for solitary tree species, using binoculars, flashlight, and an approximately 1,965-Lumen spotlight to illuminate roost features from the ground.

No night emergence surveys were conducted of buildings or trees, and no trees with suitable potential roost habitat were marked during my daytime habitat assessment. Buildings were assigned numbers for the purposes of identification in this report, and are shown in Table 1.

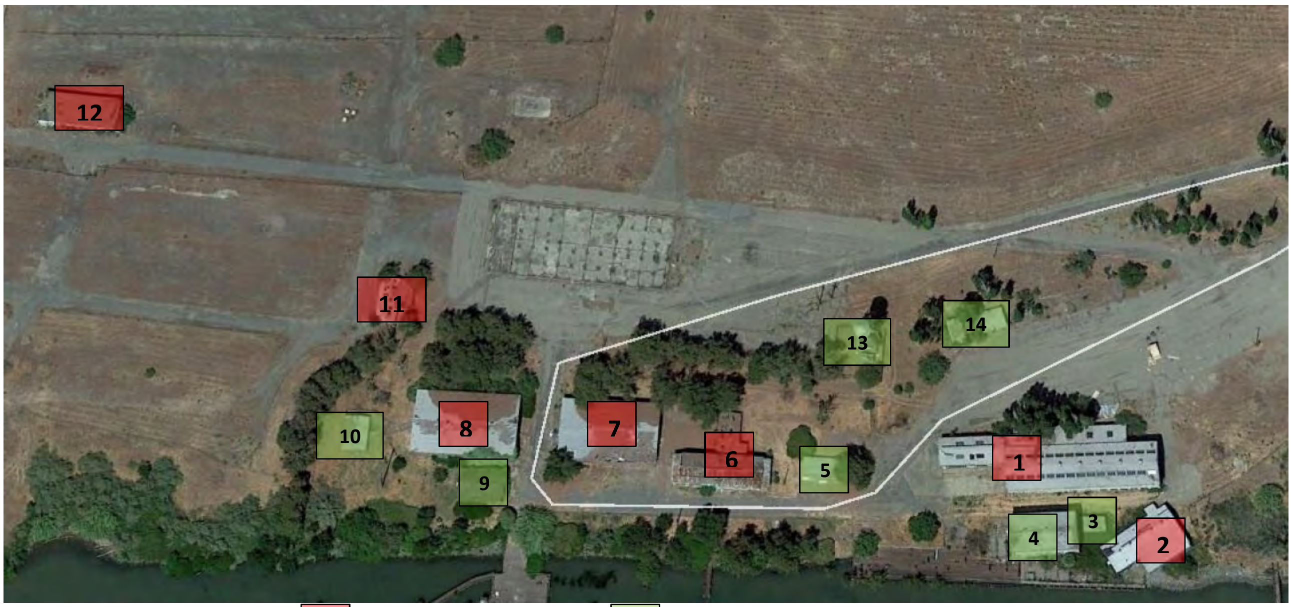


Figure 1. Buildings Surveyed: # Signs of Bat Use # No Signs of Bat Use

RESULTS

Buildings

All of the buildings were in varying degrees of decay, with many having open windows, doors, and walls, and several with damage to roof surfaces and eaves. Due to their age (70-90 years), all of the structures were built using construction materials and methods that are attractive to bats, including wood walls, studs and stringers, wood window frames, wood roof trusses, beams and rafters. Some contain finished or unfinished interior rooms that provide dark, protected areas for bats. Most are clad with asbestos shingles, referred to in this report by an old trade name - Transite - over wood siding.

Suitable openings for entry by bats occur in all structures through open or missing windows and doors, or damage to walls or roof areas. Some structures are so open to the elements that wind moves freely throughout, which would lead inexperienced observers to conclude that bats would not be present in the structures. However, the materials and interior complexity of structure within these buildings provide a wide variety of protected roost areas, including large, open spaces in rooms, cavities in walls or ceilings, and crevices between beams, rafters, trusses, and wall studs, for example.

Evidence of past and present use by bats was observed in 7 of the 14 buildings on the site; Buildings 1, 2, 6, 7, 8, 11 and 12. Signs of bat use in all 7 buildings suggest night roost activity; however, of the 7 buildings containing evidence of bat activity, 2 contained live bats, confirming their use as day roosts. In particular, Building 12 contained two active maternity colonies of *T. brasiliensis*, and Building 7 contained a solitary *T. brasiliensis*, but large accumulations of fecal pellets below that individual's roost and another identical one on the opposite wall indicate that the building is used by larger numbers of bats for day roosting activity, most likely, also as a maternity roost.

In addition to evidence of other bat species, Buildings 1, 6 and 8 also contained roost features suitable for *C. townsendii*, and several fecal pellet accumulations consistent with this species, however no live or dead individuals were present, suggesting these buildings may provide only night roost habitat. Building 3, a very small structure, was not safe to enter, but the interior was mostly visible through windows.

Table 1 provides details on building construction and condition for each structure, along with type of bat roost habitat present, and bats observed. Shaded cells within Table 1 highlight those buildings where signs of bats and/or bats were observed.

Trees

Upon careful examination through binoculars, no trees on the site contained suitable potential roost features for colonial bat species, in the form of cavities, crevices or exfoliating bark, despite the occurrence of many trees with distal snag limbs or branches, and several completely dead trees on the site.

Suitable potential bat roost habitat is present in the foliage of many of the trees, particularly for *L. blossevillii*, and *L. cinereus*.

Figure 2. Aerial photo showing results of bat assessment and survey per building.

TABLE 1. RESULTS OF BUILDING SURVEYS

Number (Bat HA)	Number (USACE)	Building Description/Construction	Roost Habitat Type	Bats Observed	Signs Observed
1	T-11	Very large, tall, open warehouse. Open roof rafters, beams. Wood frame, concrete floor. Transite ext. siding over wood, composition roof. Many open windows and doors.	Night Roost Potential Day Roost	None	Large accumulations of bat fecal pellets, several locations, several bat species. **Potential *C. townsendii* roost** in dark, small bathroom.
2	T-7	Large, wood frame, Transite ext. siding over wood, open roof rafters, roll roofing. Rear attached shed with metal roof. Interior Transite walls. Many open doors and windows.	Night Roost	None	Small amounts of bat fecal pellets.
3	T-8	Small, wood frame, Transite ext. siding over wood, composition roof. Open door and windows.	None	None	None
4	T-9	Large, wood frame, Transite ext. siding over wood, composition roof. Exposed wood beams and rafters. Open doors and windows.	None	None	None
5	T-25	Small office building, wood frame, corrugated metal roof and walls. Open doors and windows.	None	None	None
6	T-26	Two-story barracks-style building. Wood frame, Transite ext. siding, corrugated metal roof. Many interior rooms. Casement windows with sash weight spaces. Partially finished ceilings – failed acoustic tiles. Single-story attached	Night Roost Potential Day Maternity Roost Potential Day Roost	None	Large accumulations of bat fecal pellets, several bat species. Widely and heavily distributed throughout lower floor, less heavily upper floor. Several suspected ***C. townsendii*** roost locations.

		building, roof partly open to sky.			*Myotis* sp. fecal accumulations in sash cord pockets of exterior window surfaces.
7	T-27	Large, two-story workshop. Wood frame, corrugated metal siding and roof. Many open doors and windows. Debris inside. Several rooms ground floor, one large perimeter loft above.	Night Roost Potential Day Maternity Roost Potential Day Roost	None	Large accumulations of bat fecal pellets in classroom, other rooms. Several bat species, including *T. brasiliensis*. More heavily distributed throughout lower floor than upper, except beneath hoist assembly at upper loft near open door.
8	T-42	Large, two-story C. Wasiak warehouse. Wood frame, metal siding, composition roof. Many finished rooms on both floors, failed drop ceilings.	Day Roost Potential Maternity Day Roost Night Roost	Single *T. brasiliensis*	Several heavily used roost locations, suitable for day and/or night roosting. Heavy accumulations of *Myotis* sp. and *T. brasiliensis* fecal pellets. Numerous suspected roost locations for ***C. townsendii***. One *T. brasiliensis* roosting in crevice at posts near entry door, similar roost opposite.
9	T-41	Adjacent to 8, medium-size, wood frame, single story, wood exterior, ivy covered. Wood interior walls, ceilings, floors collapsing. Unsafe to enter.	Unknown	None	Unsafe to enter, but photographs taken through windows show no evidence of bats.
10	T-43	Small, wood frame, corrugated metal siding and roof. Open doors and windows.	None	None	None
11	T-46	Medium, wood frame, Transite ext. siding over wood. Composition roof. Many holes in roof, open doors and windows.	Night roost	None	Few bat fecals on floor.
12	T-50	Rigging Loft. Medium-large, wood frame, single-story. Transite over wood. Interior office room, bathroom. Lofts. Exposed	Maternity Day Roost Night roost	Ca. 16 *T. brasiliensis*	Two distinct maternity day roost locations between roof support truss beams. Colony size probably larger

		wood beams and rafters.			than observed; will increase in May.
13	T-24 T-23	Pump shed and Water Tower. Wood frame shed, Transite ext. siding over wood, roll roofing.	None None	None None	None None
14	T-22	Medium open shed building, wood frame, corrugated metal siding and roof. Attached open carport.	None	None	None

Confirmed bat roosting activity.

DISCUSSION

Buildings

Several species of bats are actively using half of the buildings on the site, predominantly for night roosting, but some, also for maternity day roosting. Many of the buildings are in such poor condition that light and airflow levels exceed those that bats find acceptable for day roosting activity - at least in the larger, more open portions of the structures. Evidence of use by bats in these buildings, or portions of these buildings, appears to be limited to night roosting activity, mostly by *Myotis* (presumably *yumanensis*), and *T. brasiliensis*, as well as other, less numerous species.

Despite the predominant appearance of night roosting activity, much of the evidence of use was by *T. brasiliensis*, a species which forms maternity colonies sometimes weeks later than other bat species using the same roost locations. The presence of a single individual in Building 8 (T-42) roosting in a crevice large enough to contain dozens of bats, with an identical crevice on the opposite wall, both showing evidence of extensive use by this species, suggests that these roosts may provide small maternity roost sites that would be more fully occupied shortly after the date of my habitat assessment. This is further supported by the presence of two maternity colonies already established in Building 12 (T-50) on the date of my survey. Therefore, it is possible that some of the buildings provide suitable day roosting habitat for males and non-reproductive females, or maternity day roost habitat for females and pups. Winter usage is difficult to predict, based on this habitat assessment.

Of particular interest was the presence of fecal pellets that are characteristic of those from *C. townsendii*. Characteristic fecal accumulations were present beneath protrusions from ceilings of small and medium-sized open rooms - also quite typical with this species - although I have found that some *Myotis* species will roost in this same manner inside buildings. No individual *C. townsendii* were present during my daytime survey, which was conducted during maternity season for this species. This suggests the buildings are used for night roosting activity by *C. townsendii* that are foraging in the area. The abundance of suitable roost locations and distribution of fecal matter consistent with this species suggest they have likely been using Buildings 1 (T-11), 6 (T-26) and 8 (T-42) for many years. See Survey Photographs in Appendix A.

Redevelopment of the site, whether buildings are demolished or renovated, will result in loss of building roosting habitat for several colonial species, and will differentially impact those species using the site. Loss of maternity roost habitat will occur for at least *T. brasiliensis*, and possibly *M. yumanensis* and other species. Loss of suitable night roost habitat will occur for *C. townsendii*, *T. brasiliensis*, and possibly *M. yumanensis* and other species. Additional, focused studies by a qualified bat biologist would be required to provide more complete data on species, population, and roost usage, if desired or required.

Trees

At the time of my surveys, trees on the site did not provide suitable roost features for colonial bat species. However, proximity to the river and surrounding foraging areas, along with density of available tree foliage, provide suitable roost habitat for solitary tree bats. Removal of trees should be conducted in a manner that permits bats to avoid direct mortality. In addition, trees may develop suitable potential roost features prior to removal; this would require two-step tree removal to minimize or prevent direct mortality of colonial bat species.

RECOMMENDATIONS

Buildings

As a minimum avoidance measure, removal or renovation of structures must be preceded by either humane eviction, phased dismantling, and/or deterrent methods to be used only during seasonal periods of bat activity, in order to prevent direct mortality of non-volant young during maternity season, or adults and juveniles during winter months when in torpor. Humane eviction is least likely to be feasibly conducted, based on the poor condition of the structures, because it requires blockage of all potential openings, together with installation of one-way exits on active openings. More feasible for the buildings at this site is partial dismantling, which involves removal of specific sections of roof and walls to open a structure to the degree that bats would not select it as a roost any longer. Because most of the buildings are already mostly exposed to light and airflow, additional measures may be required to cause bats to abandon the structures prior to demolition or renovation activities, since most day roosting is occurring in protected crevices within the structures. Such measures include installation of temporary, bright lighting inside the structures, aimed at roost locations, coupled with circulating air fans to increase airflow to roost locations.

Humane bat eviction and/or partial dismantling of occupied buildings must only be conducted during seasonal periods of bat activity, which are in this region, between March 1 (or after evening temperatures rise above 45F and/or no more than 1/2" of rainfall within 24 hours occurs), and April 15, or between August 31 and October 15 (or before evening temperatures fall below 45F and/or more than 1/2" of rainfall within 24 hours occurs).

A detailed plan for each building should be developed closer to proposed redevelopment activities – 6 months prior is recommended. The detailed plan, developed by a qualified bat biologist, would account for current conditions within the structures, and afford enough time for planning and implementation.

Waiting until 6 months prior to demolition and/or renovation to develop a detailed dismantling/deterrent plan for each building will also provide time for additional, focused surveys of the buildings to better determine the extent and species composition of day maternity roost usage. In particular, due to its regulatory status, it is important to determine if *C. townsendii* are actually using the buildings, as data from this habitat assessment and survey indicate, and if so, to what extent.

Focused surveys for *C. townsendii* should be conducted to maximize potential detection, but minimize disturbance during maternity season. To accomplish this, night surveys of the buildings should be conducted by a qualified bat biologist possessing a Scientific Collection Permit with the CDFW, and special authorizations from the Department to work with bats (formerly referred to as a Memorandum of Understanding – MOU), as well as a 2081(a) permit under the CESA for work with *C. townsendii*. Surveys should consist of one or more of the following: night roost surveys using night vision equipment and/or infrared sensitive optical or video equipment, and/or night emergence surveys of buildings, using night vision equipment and/or infrared sensitive optical or video equipment and bioacoustic detectors (bat detectors), which should be deployed to maximize detection at building roosts during emergence, and minimize detection from other buildings or surrounding areas. Passive infrared camera stations located inside suspected *C. townsendii* roost locations should also be deployed where feasible.

Loss of *C. townsendii* day roost habitat for males and/or non-reproductive females, or maternity roost habitat if present (unlikely, based on this habitat assessment and survey), or even loss of night roost habitat for this species, may require additional mitigation measures for loss of roost habitat. Results of focused surveys should be presented to CDFW for consultation regarding suitable mitigation measures for this species.

Table 2 provides a list of buildings and synopsis of recommended avoidance, minimization, and mitigation measures. Shaded cells in Table 2 refer to those buildings where signs of bats, or bats, were observed. Recommendations for partial dismantling and/or deterrent methods apply to additional buildings, because bats may begin using other buildings not currently used, or may move to them following actions at currently occupied roosts.

TABLE 2. AVOIDANCE/MINIMIZATION AND MITIGATION RECOMMENDATIONS PER BUILDING

Number (Bat HA)	Number (USACE)	Avoidance/Minimization and Mitigation Recommendations
1	T-11	1. Focused surveys for *C. townsendii* by a qualified bat biologist (see text). 2. Partial dismantling and deterrent methods during seasonal periods of bat activity (see text). 3. Consult with CDFW for habitat mitigation if needed.
2	T-7	1. Focused surveys for *C. townsendii* by a qualified bat biologist (see text). 2. Partial dismantling and deterrent methods during seasonal periods of bat activity (see text). 3. Consult with CDFW for habitat mitigation if needed.
3	T-8	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.
4	T-9	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.
5	T-25	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.
6	T-26	1. Focused surveys for *C. townsendii* by a qualified bat biologist (see text). 2. Partial dismantling and deterrent methods during seasonal periods of bat activity (see text). 3. Consult with CDFW for habitat mitigation if needed.
7	T-27	1. Focused surveys for *C. townsendii* by a qualified bat biologist (see text). 2. Partial dismantling and deterrent methods during seasonal periods of bat activity (see text). 3. Consult with CDFW for habitat mitigation if needed.
8	T-42	1. Focused surveys for *C. townsendii* by a qualified bat biologist (see text). 2. Partial dismantling and deterrent methods during seasonal periods of bat activity (see text). 3. Consult with CDFW for habitat mitigation if needed.
9	T-41	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.
10	T-43	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.
11	T-46	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.
12	T-50	1. Partial dismantling and deterrent methods during seasonal periods of bat activity.
13	T-24 T-23	1. Partial dismantling of building during seasonal periods of bat activity.
14	T-22	1. Partial dismantling and/or deterrent methods during seasonal periods of bat activity.

Confirmed bat roosting activity.

Trees
A follow-up tree habitat assessment should be conducted if project activities will not commence until 1 year from this habitat assessment and survey. If no trees have developed suitable potential bat roost habitat (cavities, crevices, exfoliating bark) during that time, avoidance and minimization measures would be needed only to address impacts to individual colonial bats using trees for temporary roosts, and obligate tree bats, such as *L. blossevillii* and *L. cinereus*.

Because these two bats raise their young in the foliage of trees, however, removal during maternity season must not occur unless a visual survey can be conducted by a qualified bat biologist, and it can be determined that no bats are present during those months. Similarly, tree removal during winter months may result in direct mortality of torpid bats. To further reduce potential for direct mortality of *L. blossevillii* or *L. cinereus,* removal of remaining trees should begin with building demolition, and removal of smaller trees and shrubs, followed by removal of the larger trees.

Tree removal must only be conducted during seasonal periods of bat activity, which in this region are between March 1 (or after evening temperatures rise above 45F and/or no more than 1/2" of rainfall within 24 hours occurs), and April 15, or between August 31 and October 15 (or before evening temperatures fall below 45F and/or more than 1/2" of rainfall within 24 hours occurs) – unless a focused, visual survey using appropriate lifting equipment, lights and binoculars, conducted by a qualified bat biologist, determines that no bats are present in trees to be removed.

If a follow-up tree assessment and survey after 1 year determines that suitable potential roost habitat has developed, those trees should be marked, and two-step tree removal conducted, to prevent direct mortality of colonial bats. Unlike with most surveys of foliage to determine presence or absence of foliage-roosting bats, conducting visual surveys of colonial bat roost features is only rarely possible. This is due to difficulty with access to trees and roost features, particularly when many trees are present. Further, night emergence surveys of potential roost trees is generally only logistically and economically feasible when only a few habitat trees occur, since only 1-2 trees can be surveyed each night per observer. Also, because bats tend to switch tree roosts more frequently than more stable roosts such as caves, mines, rock outcrops, buildings, bridges, or culverts, negative results have extremely limited temporal validity (24-48 hours), which would result in multiple mobilizations by tree cutters in order to remove trees immediately after a negative survey. In the event a tree is found to be occupied, a method for safely getting the bats out of the tree would still be needed.

I have developed a method that provides the most reasonable and cost-effective opportunity for bats to abandon the roost tree prior to cutting. This is a two-step method, *conducted over two consecutive days*, and works by creating noise and vibration by cutting non-habitat branches and limbs from habitat trees using chainsaws only (no excavators or other heavy machinery) on Day 1. The noise and vibration disturbance, together with the visible alteration of the tree, is very effective in causing bats that emerge nightly to feed, to not return to the roost that night. The remainder of the tree is removed on Day 2.

Two-step tree removal must only occur during seasonal periods of bat activity as described above; however, there are certain, limited exceptions, such as when the roost features can be visually surveyed and absence of bats can be determined, or when the roost features do not provide suitable maternity or overwintering habitat (e.g. shallow crevices in bark or wood).

In the event there are accessible cavities and colonies of bats are suspected, a visual inspection using fiber optic or video probes could be conducted outside the seasonally restricted periods, to permit removal at that time, if no bats are present. If all roost features can be completely surveyed, the entire tree may be removed in one action, making two-step removal unnecessary.

A bat biologist qualified in two-step tree removal is required on Day 1 to supervise and instruct the tree-cutters who will be on the site conducting the work, for a time sufficient to train all tree cutters who will conduct two-step removal of habitat trees. The bat biologist is not required on Day 2, unless a very large cavity is present and a large colony is suspected.

Two-step Tree Removal:

a. Removal of potential habitat trees or snags shall be conducted using a two-stage process over two consecutive days (e.g. Tuesday and Wednesday, or Thursday and Friday). With this method, small branches and small limbs containing ***no*** cavity, crevice or exfoliating bark habitat on habitat trees, as identified by a qualified bat biologist are removed first on Day 1, ***using chainsaws only*** (no dozers, backhoes, etc.). Trees containing suitable potential habitat must be trimmed on Day 1 under initial field supervision by a qualified bat expert to ensure that the tree cutters fully understand the process, and avoid incorrectly cutting potential habitat features or trees. After tree cutters have received sufficient instruction, the qualified bat expert does not need to remain on the site.
b. The following day (Day 2), the remainder of the tree is to be removed. The disturbance caused by chainsaw noise and vibration, coupled with the physical alteration, has the effect of causing colonial bat species to abandon the roost tree after nightly emergence for foraging. Removing the tree the next day prevents re-habituation and re-occupation of the altered tree.

REFERENCES

U.S. ARMY CORPS OF ENGINEERS. SACRAMENTO DISTRICT. 1999. PRELIMINARY FINAL ENVIRONMENTAL ASSESSMENT FOR DISPOSAL AND REUSE OF THE RIO VISTA ARMY RESERVE CENTER, CALIFORNIA. PREPARED FOR: U.S. ARMY FORCES COMMAND. OCTOBER.

CITY OF RIO VISTA. 2010. DRAFT ENVIRONMENTAL IMPACT REPORT. RIO VISTA ARMY RESERVE CENTER REDEVELOPMENT PLAN. STATE CLEARINGHOUSE #2010012028. PREPARED WITH THE ASSISTANCE OF WAGSTAFF/MIG. AUGUST.

Personal Communications

FISHER, KEVIN. 2015. HORIZON WATER AND ENVIRONMENT. TELEPHONE AND EMAIL DISCUSSIONS. APRIL 3-8.

RUSSELL, ED. 2015. BUILDING INSPECTOR. CITY OF RIO VISTA. DISCUSSIONS DURING SITE VISIT. MAY 15.

APPENDIX A – SURVEY PHOTOGRAPHS

Photo 1. Building 1. Active night roost, various species, including *C. townsendii*. Potential day roost.

Photo 2. Building 1 interior. Many potential roost areas at wall support beams, rafters, interior rooms.


Photo 3. Building 1. Bat fecal pellets beneath roost between window frame and wall studs.

Photo 4. Building 1. Bat roost.

Photo 5. Building 1. Bat fecals, including many consistent with C. townsendii. Found in bathroom.

Photo 6. Building 1. Roost consistent with type used by *C. townsendii*, above fecal accumulation, Photo 5, in bathroom.

Photo 7. Building 3. No signs of bats.


Photo 8. Building 4. No signs of bats.

Photo 9. Building 4 interior. No signs of bats.

Photo 10. Building 5. No signs of bats

Photo 11. Building 6. Signs of several bat species, including potential *C. townsendii* in several locations.

Photo 12. Building 6. Bat roosting activity at gap between exterior window frames and wall. Myotis sp.

Photo 13. Building 6. Bat fecal pellets widely distributed throughout.

Photo 14. Building 6. Bats night roosting from ceiling tiles, light fixtures, furring strips.

Photo 15. Building 6. One of many roost locations throughout building.

Photo 16. Building 6. Several locations of fecal pellets consistent with *C. townsendii*.

Photo 17. Building 6. Roost consistent with *C. townsendii*.

Photo 18. Building 6. Bat fecal pellets consistent with *C. townsendii* in several locations throughout lower floor.

Photo 19. Building 6 rear extension. Badly damaged roof, no signs of bats.

Photo 20. Building 7. Active night and potential day roosting by several bat species, including *T. brasiliensis*.

Photo 21. Building 7. Interior. Many suitable roost locations from rafters, beams.

Photo 22. Building 7. Upper floor. *T. brasiliensis* roost present – see Photo 23.

Photo 23. Building 7. *T. brasiliensis* night roost, potential day roost.

Photo 24. Building 8. Very heavy night roosting activity throughout structure, including potential *C. townsendii*, and confirmed day roosting by *T. brasiliensis*.

Photo 25. Building 8. Interior. *T. brasiliensis* day roosts at arrows.

Photo 26. Building 8. Bat roost at top of beam.

Photo 27. Building 7. Fecal accumulations consistent with *C. townsendii* in several locations.

Photo 28. Building 7. One of several roosts consistent with *C. townsendii*.

Photo 29. Building 8. Upper floor. Active bat roost in hanging burlap, arrow.

Photo 30. Building 8. Day-roosting *T. brasiliensis*.

Photo 31. Building 9. No signs of bats.

Photo 32. Building 9. Interior, showing damage and exposure.

Photo 33. Building 10. No signs of bats.

Photo 34. Building 10. Interior.

Photo 35. Building 11. Minimal signs of night roosting activity. Badly damaged roof.

Photo 36. Building 11. Interior.

Photo 37. Building 12. Active maternity day roosts, *T. brasiliensis*.

Photo 38. Building 12. One of 16 *T. brasiliensis* observed.

Photo 39. Building 12. One of two roost locations across entire beam (arrow).

Photo 40. Building 13. Water tank pump house. No signs of bats.

Photo 41. Water tank. No visible entry points.

Photo 42. Building 14. No signs of bats.

Photo 43. Trees, many with dead upper branches or limbs, but no suitable potential cavity, crevice, or bark habitat.

Photo 44. Trees with dead limbs and branches but no suitable habitat features for colonial bats.

Special-Status Species Descriptions

SPECIAL-STATUS SPECIES DESCRIPTIONS

1. Plants

Bolander's water hemlock (Cicuta maculata L. var. bolanderi)

Bolander's water-hemlock (California Rare Plant Rank [CRPR] 2B.1[1]) is a hydrophilic, perennial herb found in coastal, brackish, and freshwater marshes. The species can be found in California's Central and South Coast regions, with known occurrences in Point Reyes National Seashore and Suisun Marsh (CalFlora 2015). Development, competition from non-native plant species, and hydrological alterations are the main treats to Bolander's water-hemlock.

Tidal freshwater marsh at the RVARC site provides potentially suitable habitat. Although there are no CNDDB records within the vicinity of the RVARC site, reported observations have been documented upstream and downstream of the site (CalFlora 2015; CNPS 2014). The Ryde Avenue site lacks suitable habitat for this species.

Woolly rose-mallow (*Hibiscus lasiocarpos var. occidentalis*)

Woolly rose-mallow (CRPR of 1B.2) is endemic to California, with scattered occurrences in the southern foothills of the Cascade Range, the Sacramento Valley, and the Delta (CNPS 2014). The perennial herb grows along freshwater river channels, sides of levees, and marshes (Hill 2013; CNPS 2014). Threats to woolly rose-mallow are habitat disturbance, development, agriculture, recreational activities, weed control measures, erosion, and channelization of the Sacramento River and its tributaries.

CNDDB records overlap with the RVARC site, but it is undiscernible if observations occurred within the site itself. Reconnaissance surveys of the RVARC site did not detect woolly rose-mallow. However, the shoreline along the RVARC site provides potentially suitable habitat. At the Ryde Avenue site, patches of freshwater marshes along the Deep Water Ship Channel (DWSC) provide potentially suitable habitat. There are two CNDDB records within 5 miles of the Ryde Avenue site.

Northern California black walnut (*Juglans hindsii*)

This deciduous tree is found in riparian forest or mixed riparian habitats. Native stands of northern California black walnut have been assigned a CRPR of 1B.1. The CNDDB reports

[1] California Rare Plant Rank (CRPR):
1A = Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B = Plants Rare, Threatened, or Endangered in California and Elsewhere
2A = Plants Presumed Extirpated in California, But More Common Elsewhere
2B = Plants Rare, Threatened, or Endangered in California, But More Common Elsewhere
X.1 = seriously threatened in Calfornia, X.2 = fairly threatened, X.3 = not very threatened

extant native stands of northern California black walnut in Napa, Lake, and Contra Costa counties (CDFW 2015). Historic occurrences on both sides of the Sacramento River between Freeport and Rio Vista existed prior to 1949, but are now considered extirpated (CDFW 2015). Threats to northern California black walnut are urbanization, conversion to agriculture, and hybridization with orchard trees.

The species is reported within the RVARC site in previous assessments (USACE 2000), but documentation for identification as the rare, native *Juglans hindsii* was not provided. CNDDB reports the occurrence of *Juglans hindsii* that overlaps with the RVARC site as extirpated. The individual trees within the RVARC site would be considered naturalized, and native stands would not be expected. Native stands are not present at the Ryde Avenue site.

Delta tule pea (*Lathyrus jepsonii var. jepsonii*)

Delta tule pea (CRPR 1B.2) occurs on the slopes of brackish and freshwater marshes, along the margins of San Pablo Bay, Suisun Bay, Suisun Marsh, and the rivers and sloughs of the Delta (CNPS 2015). This plant is threatened by agriculture, water diversions, and erosion.

Delta tule pea has been observed within the RVARC site in the tidal freshwater marsh near the marine railway. The species is potentially present in other locations along the shoreline. At the Ryde Avenue site, patches of freshwater marsh along the DWSC provide suitable habitat for this species. There is one CNDDB record within 5 miles of the Ryde Avenue site on the opposite bank of the DWSC on Rough and Ready Island. This record is from 1903 and possibly extirpated.

Mason's lilaeopsis (*Lilaeopsis masonii*)

Mason's lilaeopsis (CRPR of 1B.1) and is state-listed as rare (CNPS 2015). This species, endemic to California, grows in erosion and deposition areas on the margins freshwater and brackish tidal marshes. Threats to Mason's lilaeopsis are erosion, channel stabilization, development, flood control projects, recreation, agriculture, shading resulting from marsh succession, and competition with invasive water hyacinth (*Eichhornia crassipes*).

Mason's lilaeopsis occurs commonly in Suisun Bay, Suisun Marsh, and the Delta, with several reported occurrences within 5 miles up- and down-stream of the RVARC site (CDFW 2015). Riprap along the shoreline of the RVARC site that extends from the upper banks to the intertidal slope limits the amount of suitable habitat. However, small depositional zones on and adjacent to the RVARC site may support Mason's lilaeopsis. This species is not expected at the Ryde Avenue site. Although there are four CNDDB occurrences of this species within 5 miles of the Ryde Avenue site, none are in the DWSC/San Joaquin River. Additionally, riprap that extends from the upper banks to the subtidal zone in the DWSC limits suitable habitat.

Delta mudwort (*Limosella australis*)

Delta mudwort (CRPR 2B.1) is mostly found within the Sacramento-San Joaquin Delta and very limitedly in Suisun Bay (CDFW 2015). Probably the rarest of the suite of Delta rare plants, this species grows on the bare mudflats and river banks (CDFW 2015). It is also found in tidal brackish emergent wetland, tidal freshwater emergent wetland, and riparian scrub.

Threats to this species include streambank alteration, levee maintenance, erosion, recreation, and trampling by pedestrian foot traffic.

Several documented observations of this species occurred within 5 miles of the RVARC site (CDFW 2015). However, no occurrences of this species were observed during reconnaissance surveys (Horizon 2015a). Riprap along the shoreline extending from the upper banks to the intertidal slope limits suitable habitat, but small depositional zones may possibly support this species. Riprap also limits suitable habitat at the Ryde Avenue site. There are no CNDDB occurrences of this species within 5 miles of the Ryde Avenue site and this species is not expected to be at the Project site.

Sanford's arrowhead (*Sagittaria sanfordii*)

Sanford's arrowhead (CRPR of 1B.2) is endemic to California, found within the North Coast, the Coast Range, the Central Valley, the Sierra Nevada foothills, the Sacramento-San Joaquin Delta, and southern California (Calflora 2015). Despite the wide distribution range, Sanford's arrowhead has been extirpated from southern California and mostly extirpated from the Central Valley (CNPS 2015). Grazing, development, recreational activities, nonnative plants, road expansion, and channel alteration and maintenance are common threats to this species. Preferred habitat areas include freshwater emergent wetlands with standing or slow-moving water.

Tidal freshwater marsh areas at the RVARC and Ryde Avenue sites provide potentially suitable habitat for this species. CNDDB occurrences were documented along the Sacramento River, approximately 2.5 miles northeast of the RVARC site. Only one CNDDB occurrence (reported in 1901 along a slough) is within 5 miles of the Ryde Avenue site, but the species is broadly mapped 1.1 miles east of the project site.

Side-flowering skullcap (*Scutellaria lateriflora*)

Side-flowering skullcap (CRPR 2.2) is widely distributed throughout most of the United States and parts of Canada, but only known in California from three separate occurrences (CNPS 2015; USDA 2015). Side-flowering skullcap is reported to occur limitedly within the Sacramento-San Joaquin Delta. This species inhabits freshwater marshes and seasonal wetland meadows below 1,000 feet above mean sea level. Within the Delta, side-flowering skullcap is often observed growing on logs (CDFW 2015).

Both the RVARC and Ryde Avenue sites provide potentially suitable habitat for this species within tidal freshwater marsh areas.

Suisun Marsh aster (*Symphyotrichum lentum*)

Suisun Marsh aster (CRPR 1B.2) is endemic to California. Historic occurrences of this species have been reported in within the foothills bordering the eastern edge of the Central Valley, in Sonoma and Santa Clara Counties, and throughout the San Francisco-San Joaquin Delta, particularly in Suisun Marsh and Suisun Bay (Calflora 2015). Often observed within brackish and freshwater marshes, freshwater emergent wetlands, and the fringes of sloughs. Habitat alteration and loss, and erosion seriously threaten this species (CNPS 2015). May also be threaten possibly herbicide application.

Suisun Marsh aster was observed during biological surveys at both the RVARC and Ryde Avenue sites (Horizon 2015a and 2015b). At the RVARC site, Suisun Marsh aster was observed in freshwater marsh and derelict piers along the river, especially at the marine railway in the northeastern corner. At the Ryde Avenue site, a small (5-foot by 8-foot) colony was observed along the shoreline of the DWSC in September 2014.

2. Wildlife

Amphibians and Reptiles

Western pond turtle (*Actinemys marmorata*)

The western pond turtle (species of special concern) occurs along the Pacific Coast of North America from Baja California and into Washington and British Columbia. In California, western pond turtles inhabit up to 90% of its historic range but in dramatically reduced numbers in the Central Valley and west of the Sierra Nevada (Jennings and Hayes 1994).

Western pond turtles are small to medium in size, with adults averaging 4.5-8.25 inches in shell length. From a distance, this species looks uniformly dark green or brown from head to tail. Upon closer inspection, the head and neck are flecked with khaki and brown markings.

Slow moving or slack water habitats, including ponds, lakes, rivers, streams, creeks, and marshes, are typical habitat for this species. Large amounts of vegetation, partially submerged logs, rocks, or open mud banks for basking are also a necessity. The diet of the western pond turtle is omnivorous ranging from aquatic plants, invertebrates, worms, amphibian eggs, crayfish, and fish. Nests are located upland, generally within 500 feet of the water. Western pond turtle nesting season spans from late May to early July.

There are no CNDDB occurrences within 5 miles of the RVARC site. However, previous reports state that this species is present in the RVARC site in marsh and riparian habitats (USACE 2000). The Ryde Avenue site lacks suitable habitat for this species and is not expected on site.

Birds

Tricolored Blackbird (*Agelaius tricolor*)

Tricolored Blackbirds (emergency protection status under CESA, species of special concern) were assigned Emergency Protection Status in California as of December 3, 2014 per Fish and Game Code 2076.5. Although isolated colonies of Tricolored Blackbirds can be found in Oregon, Washington, Nevada, and coastal Baja California, greater than 99% of the total population of the species live in California, with 90% residing in the Central Valley most years (CDFG 2008). Four years of censuses of all known California colony sites pointed to alarming declines in species numbers, from 369,359 in 1994 down to 162,508 in 2000, and less than 150,000 birds in 2014 (CDFG 2008, Center for Biological Diversity 2015). Several factors are thought to contribute to the decline in Tricolored Blackbird numbers including loss of native habitats and colony destruction by agricultural activities (Center for Biological Diversity 2015).

Tricolored Blackbirds form the largest breeding colonies of any North American landbird (Cook and Toft 2005), historically selecting freshwater marshes dominated by cattails. Habitat loss and land use changes encouraged colony development within nettles, thistles, willows, Himalayan blackberry (*Rubus armeniacus*), and grain fields. Prior to breeding, Tricolored Blackbirds eat primarily grains. During the breeding season this species feeds on grasshoppers, beetles, weevils, and other insects.

Previous reports state that this species is present in the RVARC site (USACE 2000), although nesting is not expected. This species was not present at the RVARC during a site visit conducted in late April 2015, which coincided with the breeding season. There are no reported CNDDB occurrences within 5 miles of the RVARC site. The Ryde Avenue site lacks suitable habitat for this species is not expected.

Burrowing Owl (*Athene cunicularia*)

Burrowing Owls (species of special concern) historic range stretched throughout most of California, with the exception of the coastal counties north of Marin and mountainous regions (Grinnell and Miller 1944). The present day range remains largely unchanged but local declines and extirpations have dramatically impacted species population.

The preferred breeding habitat for the Burrowing Owl is dry open rolling hills, grasslands, fallow fields, as well as disturbed lands such as golf courses, airports, road embankments, and agricultural areas (Trulio 1997; Gervais et al. 2003; Rosenberg and Haley 2004). Nests are composed of sandy soil with minimal vegetation around, and are dug out by other small animals. This species feeds on anthropods, small rodents, amphibians, reptile species, birds and carrion.

The RVARC site provides marginally suitable habitat for this species. Some burrows were observed in the RVARC site, but no signs of this species were observed. Ruderal habitat in the project site is marginally suitable for this species. However, there are eight CNDDB occurrences of this species within a 5-mile radius of the project site and is possibly present at the RVARC site. At the Ryde Avenue site, this species may occasionally visit the site, but a population is unlikely to become established due to a lack of burrows and compacted soils.

Swainson's Hawk (*Buteo swainsoni*)

The Swainson's Hawk (state threatened) is a large raptor that breeds throughout much of the western U.S., Canada, and northern Mexico. Swainson's Hawk typically winter in South America (Woodbridge 1998), but there are reports of the species wintering in the Delta. In California, 95% of Swainson's Hawks are in the Central Valley (CDFG 2007) and about 85%

of Swainson's Hawks nests in the Central Valley are within riparian forest or remnant riparian trees (Woodbridge 1998).

Swainson's Hawk was listed as a threatened species in the state of California following a statewide survey conducted in 1979, estimating a 90% reduction in historic numbers (Bloom 1980). The dramatic decline in population was attributed to loss of nesting habitat, pesticide use in wintering areas, and loss or adverse modifications of foraging habitat.

This species feeds on ground squirrels, voles, and other small mammal prey during the breeding season. At other times of the year insects such as grasshopper and crickets are the primary prey. Swainson's Hawks prefer riparian habitats due to the availability and distribution of large nesting trees near foraging areas of open grasslands or croplands.

Riparian trees and mature ornamental trees provide marginally suitable nesting sites for this species at the RVARC site. Ruderal habitats in the RVARC site provide low quality foraging habitat. There are eleven CNDDB occurrences of this species within a 5-mile radius of the project site and this species may be possible on the RVARC site. The Ryde Avenue site provides low quality foraging habitat for this species, but lacks suitable/preferred breeding habitat. There are numerous CNDDB records of Swainson's Hawk within 5 miles of the Ryde Avenue site so this species may possibly be found on site.

Northern Harrier (*Circus cyaneus*)

The Northern Harrier (species of special concern) is a raptor reaching a total length of 16-24 inches, with 42-inch wingspan. Northern Harriers have a long tail and white underside. Adult males differ slightly in appearance with a gray back, head, and breast and black wingtips while females are brown above and streaked below.

Historic ranges in California stretched from Oregon south to the Mexican border, occupying most wetland habitats under 8,000 feet. By the 1940s, "relatively small numbers" remained in the state through the summer to breed, mainly due to substantial loss of wetland habitats (Grinnell and Miller 1944). The present day range is similar, although overall numbers have been reduced and some local populations have been extirpated (CDFG 2008).

Northern Harriers prefer open habitats with adequate vegetative cover, such as grasslands, a wide variety of freshwater wetlands, pastures, and croplands. Northern Harriers nest on the ground within dense vegetative cover (MacWhirter and Bildstein 1996). Rodents and small birds are the main source of food.

As reported in RVARC EA, this species has been observed onsite (USACE 2000), although nesting is not expected. Ruderal habitats in the RVARC site also provide low quality foraging habitat. The Ryde Avenue site provides potentially suitable foraging habitat for this species, but lacks suitable breeding habitat.

White-tailed Kite (*Elanus leucurus*)

The White-tailed Kite (state fully protected) is a raptor reaching a total length of 15-17 inches and a wingspan of approximately 40 inches. Adults are a pale gray with white head, underside, and tail. The species feeds mostly on small rodents, but will occasionally consume birds, large insects, reptiles, and amphibians.

White-tailed Kites prefer habitat near agricultural areas, shrubland, grasslands, meadows, or emergent wetlands. Nests are placed 20-100 feet above the ground near the top of dense oak, willow, or other tree stand (Thompson 1975). Habitat loss is the leading cause for decreasing White-tailed Kite numbers.

At the RVARC site, riparian trees and mature ornamental trees provide suitable nesting sites for this species. Marshes and ruderal habitats in the RVARC site also provide foraging habitat. This species is not expected at the Ryde Avenue site. Although the Ryde Avenue site provides potentially suitable foraging habitat for this species, it lacks suitable breeding habitat.

Loggerhead Shrike (*Lanius ludovicianus*)

The Loggerhead Shrike (species of special concern) is widely found in lower elevations throughout the U.S. except in portions of the Northwest and Northeast. Historically, Loggerhead Shrikes were classified as "common" to "abundant" throughout most of California (Grinnell and Miller 1944; Grinnell and Wythe 1927; Willett 1933). Although recent and historic breeding ranges remain similar, habitat loss and degradation has led to a downward trend in population and resulted in local extirpation throughout California (Sauer et al. 1996; Sauer et al. 2005). California's Loggerhead Shrike populations are highest in areas of the Central Valley, Coast Ranges, and the southern deserts (Saucer et al. 2005), and in winter throughout the San Joaquin Valley, the south central coast, and the south-eastern deserts (Saucer et al. 1996).

Adult Loggerhead Shrikes can be identified by their grey head and back, black eye mask, and black wings and tail over a white body. Adults grow to a total length of 8-10 inches. In California, loggerhead shrikes prefer shrublands or open woodlands, requiring tall shrubs or trees for perching with a mix or grass cover and bare ground for hunting. The species feeds primarily on large insects, reptiles, amphibians, small rodents, and small birds (Craig 1978; Yosef 1996). Loggerhead shrikes lack talons associated with many other birds of prey, instead impaling its prey on sharp, thorny, multistemmed plants and barbed-wire fences (Yousef 1996; Pruitt 2000).

Due to a lack of suitable habitat, this species is not expected at the RVARC site. Loggerhead shrike may possibly be present at the Ryde Avenue site. The Ryde Avenue site provides potentially suitable foraging habitat for this species, but lacks suitable breeding habitat.

Song Sparrow, Modesto population (*Melospiza melodia*)

The "Modesto population" of Song Sparrow (species of special concern) is endemic to the north-central portion of the California Central Valley. The highest densities of occur in the Butte Sink area of the Sacramento Valley and in brackish marshes surrounding Sacramento-San Joaquin River Delta (CDFG 2008). This species prefers emergent wetland ecosystems of that provide moderately dense vegetative cover of cattails, tules and other sedges, Slicornia, and Grindelia for nest sites and foraging opportunities (CDFW 2015). This species has also been observed in riparian woodlands and tangles bordering sloughs (CDFG 2008). The Song Sparrow diet consists primarily of foraged vegetation, but may also consume insects or spiders if resource availability is scarce.

This species may occur at both the RVARC and Ryde Avenue sites. Riparian woodlands and freshwater marsh in the RVARC site provide suitable nesting and foraging sites for this species. Likewise, the Ryde Avenue site provides potentially suitable foraging habitat for this species, but lacks suitable breeding habitat.

Mammals

Townsend's big-eared bat (*Corynorhinus townsendii*)

Townsend's big-eared bat (proposed for listing under CESA, species of special concern) range is throughout California in a wide variety of habitats (CDFW 2015). This species is found in all but subalpine and alpine habitats and is mostly abundant in mesic areas (CDFW 2000). Colonies are typically 10 to 12 miles apart and will remain in productive resources areas indefinitely if left undisturbed CDFW 1994).

Diet consists mostly of moths and other relatively slow moving flying insects. The Townsend's big-eared bat hunts using echolocation. This species is known to roost in caves, mines, tunnels, abandoned buildings and other structures, but is extremely sensitive to human disturbance and may desert roosts following a single human visit (CDFG 2000). Males are often solitary during the spring and summer while the females remain in maternity colonies fewer than 100 individuals (CDFG 2000). This species hibernate individually or in groups less than a few dozen.

Abandoned buildings at the RVARC site potentially provide suitable roosting habitat. Riverine, riparian, and marsh habitats, and adjacent ruderal habitats provide foraging habitat. This species is not expected at the Ryde Avenue site due to a lack of suitable habitat.

Western red bat (*Lasiurus blossevillii*)

The western red bat (species of special concern) is a medium-sized bat with adults weighing 0.2-0.5 ounces. Adults are reddish in color and have short, broad, and rounded ears with a short, plain nose. While in flight, a relatively long tail extends straight out giving the western red bat a distinctive silhouette against the sky as compared to other species (Barbour and Davis 1969).

In California, the western red bat occurs from Shasta County to the Mexican border, west of the Sierra Nevada. Western red bats prefer to roost in forests and woodlands from sea level up through mixed conifer forests (CDFG 2000), roosting anywhere from 2-40 feet in trees near riparian corridors fields, or urban areas. Adults feed on a variety of insects, specifically moths, crickets, beetles, and cicadas, foraging over a variety of habitats, including grasslands, shrublands, open woodlands and forests, and croplands.

Riparian and riverine habitat in the RVARC site along the Sacramento River provides suitable roosting and foraging habitat for this species, and adjacent ruderal habitats with trees also provides limited roosting and foraging habitat. There are several CNNDB records of this species within the 5-mile radius of the RVARC site. This species is not expected at the Ryde Avenue site due to a lack of suitable habitat.

3. Special Status Fish Species

Green Sturgeon, Southern DPS (*Acipenser medirostris*)

The southern Distinct Population Segment (DPS) of Green Sturgeon is a California species of special concern and listed as threatened under the ESA (71 FR 17757). Apart from spawning and the first few years of rearing, green sturgeon spend most of their lives in marine waters. Green Sturgeon reach maturity around 15 years of age, can live to be 70 years old, and may spawn several times during their long lives, returning to their natal rivers every 3-5 years. During spawning runs, adults enter San Francisco Bay between mid-February and early May and migrate rapidly up the Sacramento River (Heublein et al 2009). Spawning occurs in cool sections of the upper Sacramento River and at least some of its tributaries (Seesholtz et al. 2014) with deep, turbulent flows and clean, hard substrate. In fall, post-spawn adults move back down the river and re-enter the ocean. After hatching, larvae and juveniles migrate downstream toward the Sacramento-San Joaquin Delta and Estuary. After rearing in the Delta and San Francisco Estuary for several years, they move out to the ocean. As adults, Green Sturgeon migrate seasonally along the west coast, congregating in bays and estuaries in Washington, Oregon, and California during the summer and fall months and off northern Vancouver Island, BC, Canada during the winter and spring months (Lindley et al. 2008). Loss of spawning habitat in California has caused a reduction in Green Sturgeon throughout its range, and information regarding Green Sturgeon life history is limited due to low abundance (Moyle 2002).

The southern DPS may be present near the RVARC site year round. Although the presence of Green Sturgeon in the San Joaquin River has not been confirmed (NMFS 2008), both sites have been designated critical habitat. This species is possibly present in the vicinity of the Ryde Avenue site.

Delta Smelt (*Hypomesus transpacificus*)

Delta Smelt is listed as threatened under the ESA and endangered under CESA (75 FR 17667, Fish and Game Code §§2050 et seq.). The Delta Smelt is endemic to the San Francisco Bay Estuary and generally considered a diadromous seasonal reproductive migrant. In the winter, many adult Delta Smelt move upstream into fresh water for spawning (Moyle et al. 1992, Bennett 2005, Sommer et al. 2011). The Delta Smelt spawning migration from low-salinity rearing habitat into freshwater usually occurs between late December and late February, typically during first flush periods when inflow and turbidity increase on the Sacramento and San Joaquin Rivers (Grimaldo et al. 2009, Sommer et al. 2011). However, spawning migrations are not always upstream. During occasional periods of very high river flows that spread freshwater habitat throughout much of the estuary, some Delta Smelt “migrate downstream” from rearing habitats in Suisun Bay and the Delta to freshwater spawning habitats as far west as the Napa River (Hobbs et al. 2007). In addition, there is a small subset of the population that appears to remain in the Cache Slough Complex year round; these fish presumably stay in the region for spawning (Sommer et al. 2011). Since eggs have not been detected routinely in the wild, spawning and early rearing habitat locations are inferred from seasonal sampling efforts from the Delta margins through eastern Suisun Bay, which collect ripe adults and early stage larvae (Wang 1986, 1991, 2007). Larvae remain primarily bottom-oriented until swim bladder and fin development are complete at about 65 days of age and about 20 mm TL (Mager et al. 2004, Baskerville-Bridges et al. 2004), at which time they can fully control their buoyancy and efficiently use tidal and river currents to migrate (Sommer et al. 2011). During summer, juvenile Delta Smelt primarily rear in the west Delta, Suisun Bay, and Cache Slough Complex; they remain in these areas through the fall as sub-adults (Moyle 2002, Bennett 2005, Merz et al. 2011, Sommer and Mejia 2013). As in late spring and fall, the center of distribution of the fish occurs in the low salinity zone, with the exception of the Cache Slough complex.

Both the RVARC and Ryde Avenue sites are within designated critical habitat for this species and Delta Smelt may be present at both sites.

River Lamprey (*Lampetra ayresi*)

The River Lamprey is a species of special concern (Moyle 1995). The distribution of the River Lamprey ranges from Juneau, Alaska, to San Francisco Bay. Within California, this species is most commonly observed in the Sacramento and San Joaquin rivers and in some tributaries, particularly in Tuolumne River. Spawning lamprey require gravelly riffles where they can dig saucer-like depressions for nests. The majority of information on the River Lamprey's life history has been collected in British Columbia; California lamprey likely have different seasonal timing of development due differences in temperature and flow regimes. However, the general life history pattern is thought to be similar. Adults return to freshwater to spawn three to four months after entering the marine environment. After building nests and spawning, the adult lamprey die. The ammocoetes remain in the river for several years until they undergo metamorphosis for 9-10 months until they become adults. At this time, the adult River Lamprey aggregate in the Delta and migrate to the ocean (Moyle 2002).

Adult river lamprey may be present during migration periods at both the RVARC and Ryde Avenue sites. Additionally, various life stages may be present year round at both sites.

Pacific Lamprey (*Lampetra tridentata*)

Pacific Lamprey is a federal "species of concern" (USFWS 2015). In California, Pacific Lamprey spend approximately 18 months in the marine environment before returning to freshwater to spawn during the winter and spring. Pacific Lamprey are known to spend up to a year in freshwater prior to making a secondary migration before spawning in spring through summer (RREMP 2010; Stillwater Sciences 2014). Pacific Lamprey spawn in riffles with gravel/cobble substrates. Adult Pacific Lamprey migrate upstream during the spring from April through mid-June (RREMP 2010). Juvenile Pacific Lamprey, called ammocoetes, emerge from the buried nest after approximately three weeks and drift downstream to suitable rearing habitat consisting of backwater areas with soft mud/sand substrates (RREMP 2010). Ammocoetes pass through a transformation process similar to the smolting phase in salmonids. The newly transformed ammocoetes, called marcopthalmia, develop eyes and functioning mouthparts and migrated to the ocean (RREMP 2010).

Adult Pacific Lamprey may be present during migration periods at both the RVARC and Ryde Avenue sites. Additionally, various life stages may be present year round at both sites.

Steelhead, Central Valley DPS (*Oncorhynchus mykiss*)

The Central Valley DPS of Steelhead is listed as Threatened under the ESA (63 FR 13347). This DPS includes all naturally spawned populations of Steelhead in the Sacramento and San Joaquin rivers and tributaries. Propagated stocks from Coleman National Fish hatchery on Battle Creek and the Feather River Hatchery are also included in the Central Valley DPS (ICF Jones & Stokes 2010). Steelhead, as currently defined, are the anadromous form of Rainbow Trout and have been extensively studied and used for aquaculture, fisheries, and angling (McEwan and Jackson 1996). However, the Steelhead life history can be quite variable, with some populations reverting to residency or anadromy, depending on environmental conditions (Pascual et al. 2001). Adult migration from the ocean to Central Valley spawning grounds occurs during much of the year, with peak migration occurring in the fall or early winter. Migration through the Sacramento River main stem begins in July, peaks at the end of September, and continues through February or March (Bailey 1954; Hallock et al. 1961, both as cited in McEwan and Jackson 1996). Central Valley Steelhead are mostly 'winter Steelhead'; that is, they mature in the ocean and arrive on the spawning grounds nearly ready to spawn. In contrast, 'summer Steelhead', or stream-maturing Steelhead, enter freshwater with immature gonads and typically spend several months in freshwater maturing before spawning.

Historically, Central Valley Steelhead spawned primarily in upper stream reaches and smaller tributaries. Although in the Pacific Northwest, Steelhead spawn in most available channel types in unimpounded stream reaches (Montgomery et al. 1999). Due to Central Valley water development projects, most spawning is now confined to lower stream reaches below dams. In a few streams, such as Mill and Deer creeks, Steelhead still have access to historic spawning areas. The percentage of Central Valley Steelhead adults surviving spawning has not been well studied, but in general the percent of repeat spawners varies annually and between stocks in the Pacific United States (5.8-53 percent; Withler 1966). Recent acoustic tagging studies of Coleman Hatchery kelts (spawned steelhead) indicate that reconditioned kelts released in late spring may emigrate to the Pacific Ocean within weeks to months of release and return to freshwater the following fall. Others may remain in freshwater for an undetermined time. Juveniles generally remain in their natal stream for a year or more before migrating to the ocean but may emigrate within their first year (Cramer Fish Sciences 2012; Bilski et al 2010; Moyle 2002). The emigration period for naturally-spawned Steelhead juveniles migrating past Knights Landing on the lower Sacramento River has ranged from late December through May (McEwan 2001). In streams south of the American River, Steelhead emigration has been observed from November through July (Bilski et al. 2010; CFS 2012).

Central Valley Steelhead migrate past the RVARC and Ryde Avenue sites seasonally while migrating up and downstream in the Sacramento and San Joaquin Rivers. Central Valley Steelhead have critical habitat designated at both sites as well.

Chinook Salmon *(Oncorhynchus tshawytscha)*

The Central Valley supports four distinct runs of Chinook salmon: fall-run, late fall-run, winter-run, and spring-run (Yoshiyama et al. 1998, Moyle 2002). Runs are named for the season in which the adults migrate to freshwater for spawning and adults die soon after spawning (semelparous). Adults and offspring in each run have distinct patterns of natal stream residence time, spawning, and outmigration. Healey (1991) divided Chinook salmon into two life-history strategies, stream and ocean. Stream-type Chinook salmon have adults that immigrate to natal streams before they reach full maturity, in spring and summer, and juveniles that spend a relatively long time (usually >1 year) in fresh water. Ocean-type Chinook salmon have adults that spawn soon after entering fresh water, in summer and fall, and juveniles that spend a relatively short time (3-12 months) rearing in fresh water (Moyle 2002). A small portion of male Chinook salmon may complete their entire life cycle in freshwater, spawning within their first or second year (precocious). Chinook salmon in the Sacramento-San Joaquin basin generally rear in fresh water for a year or less due to higher summer temperatures as compared to other rivers in their range. Chinook salmon thrive in well-oxygenated, cool (8-12.5° Celsius) waters. This includes run, riffle, and pool stream habitats (Moyle 2002).

Chinook salmon, Central valley fall-and late-fall run ESU

Both the Central Valley fall- and late fall-run Chinook are state and federal species of special concern (64 FR 50394). According to Moyle (2002), the fall-run are an unambiguous ocean-type Chinook salmon adapted for spawning in lowland reaches of big rivers and their tributaries and occur in the Sacramento and San Joaquin River basins and tributaries east of Carquinez Strait. Fall-run adults immigrate from the ocean in late summer through early fall in mature condition and typically spawn within a few days or weeks of arriving on the spawning grounds. Juveniles typically emerge from the gravel from mid-winter through spring and move downstream within a few months, to rear in mainstem rivers or estuaries before heading to the ocean (Cramer Fish Sciences 2012; Miller et al. 2010). Late fall-run Chinook salmon are mostly a stream-type salmon largely confined to the Sacramento River today (Moyle 2002). They are the largest and most fecund salmon in California because they historically immigrated as 4- and 5-year-old fish (Moyle et al. 1995; Fisher 1994). Late fall-run adults commonly spawn after residing in cold, deep reaches of mainstem rivers for about one to three months. Juveniles enter the ocean after 7-13 months rearing in fresh water, considerably larger and older than fall-run Chinook Salmon (Moyle 2002).

The Central Valley fall- and late fall-run Chinook are present in the Sacramento River, and fall-run Chinook occur in the San Joaquin River during seasonal migration periods.

Chinook salmon, Central Valley winter-run ESU

Winter-run Chinook are listed as Endangered under both the ESA and CESA. Migrating in the winter and spring and spawning as 3-year olds in early summer, winter-run Chinook are only found in the Sacramento River (Fisher 1994, Moyle 2002). The Shasta Dam blocks migration to colder summer habitats found upstream, but because of the release of cold water during the summer, the population has persisted below the dam (Moyle 2002). Juveniles rear in the upper watershed for 5 to 10 months then move to estuaries, making them appear to be both ocean-type and stream-type, a distinct feature (Moyle 2002, Healey 1991). Winter-run Chinook have critical habitat designated at the RVARC site.

The Central Valley winter-run Chinook are present in the Sacramento River near the RVARC during seasonal migration periods.

Chinook salmon, Central Valley spring-run ESU

Spring-run Chinook are typically considered a stream-type salmon. Central Valley spring-run Chinook ESU is currently listed as threatened under both the ESA (64 FR 50394) and CESA. This ESU includes both naturally spawned populations and hatchery fish that have not had their adipose fin clipped in the Sacramento River and tributaries (NMFS 2012). Critical habitat is designated as the Upper Sacramento as well as the Sacramento-San Joaquin Delta (70 FR 52488).

Historically, spring-run were found in the larger tributaries of the Sacramento, San Joaquin, Eel, and Klamath rivers. Adult spring-run Chinook salmon leave the ocean to begin their immigration in late January and early February and enter the Sacramento River between March and September, primarily in May and June (Yoshiyama et al. 1998, Moyle 2002). Spring-run Chinook are sexually immature when they enter freshwater and gonads mature during the summer holding period. Adults may hold in natal tributaries for up to several months before spawning begins in August (Moyle 2002). Typically, spring-run Chinook salmon utilize mid- to high-elevation streams that provide appropriate temperatures and sufficient flow, cover, and pool depth to allow over-summering while conserving energy and allowing their gonadal tissue to mature (Yoshiyama et al. 1998). Spring-run Chinook have been observed to hold in deep pool habitat during summer months in high densities in rivers across their range (Wampler 1986; Barnhart and Hillemeier 1994; Moyle 2002; Massa et al. 2010). It is generally assumed that adults move out of holding pools into upper reaches to spawn or remain and spawn in the tail areas of holding pools (Moyle et al. 1995). Spring-run Chinook have been observed to exhibit net downstream movements from holding pools to spawning areas, but only over short distances (Ward et al. 2003).

Spawning occurs in gravel beds that are often located at the tails of holding pools (Allen and Hasler 1986). Spawning Chinook salmon require clean, loose gravel in swift, relatively shallow riffles or along the margins of deeper runs, and suitable water temperatures, depths, and velocities for redd construction and adequate oxygenation of incubating eggs (NMFS 2012). Currently, adult spring-run spawn from mid to late-August through early October, with peak spawning times varying among locations. Spawning occurs progressively later in the season at lower elevations as temperatures cool (Harvey 1995, 1996, 1997, all as cited in CDFG 1998).

Juveniles rear for up to 15 months before migrating to the ocean. In the past, this life history strategy allowed them to be as abundant as fall-run Chinook by utilizing cooler areas of warm, summer waters until spawning. Dams and barriers block much of the spring-run historical range today (Moyle 2002, NMFS 2009).

Spring-run Chinook are present in the Sacramento River near the RVARC during seasonal migration periods. The spring-run Chinook population was extirpated from the San Joaquin River. An experimental non-essential population of spring-run is being reintroduced to the San Joaquin basin under the San Joaquin River Restoration Program; fish from this population may move through the vicinity of the Ryde Avenue site as adults returning to spawn or as juveniles during outmigration. Spring-run Chinook have critical habitat designated at the RVARC site.

Sacramento Splittail (*Poponichthys macroleidotus*)

Sacramento Splittail (species of special concern) in California is endemic to the sloughs, lakes, and rivers of the Central Valley. Splittail live 7-9 years, tolerate a wide range of environmental conditions, and have high fecundity. Adapted to living in the fluctuating conditions of the estuarine waters, Sacramento Splittail were historically distributed throughout the Central Valley as far south as Friant in the San Joaquin River and north to Redding in the Sacramento River. In the Sacramento Valley, they were found in early surveys as far up the Sacramento River as Redding (below the Battle Creek Fish Hatchery in Shasta County), in the Feather River as high as Oroville, and in the American River to Folsom (Moyle et al. 2004).

Today, Sacramento Splittail are found most frequently in the Sacramento River below the mouth of the Feather River and become increasingly rare in an upstream direction, particularly during summer and fall. With the exception of particularly wet years, Splittail largely inhabit waters in the Sacramento-San Joaquin Delta. In wet years they can be found in the Mokelumne and Tuolumne rivers. Splittail can often be found in waters with salinities of 10-18 parts per thousand (ppt), and adults can tolerate salinities as high as 29 ppt. Splittail commonly occur in water temperatures ranging from 5 to 24° Celsius, but can tolerate temperatures up to 29-33° Celsius. Typically, adults migrate upstream in January and February and spawn on seasonally inundated floodplains in March and April but as late as July. Embryos hatch in three to seven days and remain in shallow, weedy areas for 10-14 days. April through August, the juveniles migrate back downstream to shallow, brackish water rearing grounds where they feed on detritus and invertebrates for 1-2 years before migrating back upstream to spawn (Moyle 2002; Moyle et al. 2004). Managing floodplains to promote frequent successful spawning is needed to keep them abundant. Additionally, it is important to provide safe migration corridors between spawning and rearing grounds as well as abundant high-quality brackish water rearing habitat (Moyle et al. 2004).

Sacramento Splittail may occur in both the RVARC and Ryde Avenue sites year round.

Longfin Smelt (*Spirinchus thaleichthys*)

Historically, Longfin Smelt (federal candidate, state threatened) populations were found in the Klamath, Eel, and San Francisco estuaries and in Humboldt Bay. Based on more recent sampling, extant populations reside at the mouth of the Klamath River and the Russian River estuary. In the San Francisco estuary, adult Longfin Smelt are concentrated in Suisun, San Pablo, and North San Francisco Bays (Moyle 2002, Merz et al. 2013).

Longfin Smelt are anadromous, euryhaline, and nektonic (free-swimming). Adults and juveniles are found in estuaries and can tolerate a broad salinity range, from 0 ppt to pure seawater. In the Delta, Longfin Smelt generally spend most of their lives in deep, cold, brackish-to-marine waters and prefer nearshore environments (Moyle 2002; Rosenfield and Baxter 2007). They are also capable of living their entire lives in fresh water, as demonstrated by landlocked populations. The salinity tolerance of Longfin Smelt larvae and early juveniles is more narrow, ranging from 1.1 to 18.5 ppt. After the early juvenile stage, preferred salinities shift to 15–30 ppt (Moyle 2002). Prespawning adults generally occur brackish (2–35 ppt) or marine habitats. In the fall and winter, yearlings move upstream into fresh water to spawn. Prior to spawning, these fish aggregate in deep water habitats available in the northern Delta, primarily Suisun Bay and the Sacramento River (Rosenfield and Baxter 2007). Collections of gravid adults and larval Longfin smelt indicate that the primary spawning locations for these fish are in or near the Suisun Bay channel, the Sacramento River channel near Rio Vista, and (at least historically) Suisun Marsh (Wang 1991; Moyle 2002; Rosenfield and Baxter 2007). Moyle (2002) indicates that Longfin Smelt may spawn in the San Joaquin River as far upstream as Medford Island. Spawning may occur as early as November, and larval surveys indicate it may extend into June (Moyle 2002); Longfin Smelt in the San Francisco Estuary spawn in fresh or slightly brackish water (Moyle 2002).

Embryos hatch in 40 days at 7°C and are buoyant. They move into the upper part of the water column and are carried into the estuary. High outflows transport the larvae into Suisun and San Pablo Bays. In low outflow years, larvae move into the western Delta and Suisun Bay. Higher outflows are reflected positively in juvenile survival and adult abundance. Rearing habitat is highly suitable in Suisun and San Pablo Bays in part because juveniles require brackish water in the 2–18 ppt range. Longfin smelt are pelagic foragers that feed extensively on copepods, amphipods, and shrimp (USFWS 1995; Moyle 2002).

The abundance of Longfin Smelt in the San Francisco Estuary has fluctuated over time. However, this species has been in decline since the early 1980s and was very low during the drought years of the 1990s and also in recent wet years (Rosenfield and Baxter 2007; Sommer et al. 2007). For example, the 2007 fall mid-water trawl had the lowest index (13) recorded since the survey began in 1967 (California Department of Fish and Wildlife, unpublished data). The highest index between 1988 and 2008 was 8,205 in 1995. The index in 2008 was 139 (California Department of Fish and Game 2008b). Shifts in the composition and abundance of the primary producer and primary/secondary consumer assemblages in the Delta have been implicated in the recent decline of Longfin Smelt and other native fish species (USFWS 1995; Kimmerer 2002).

Spawning occurs in the vicinity of the RVARC site during the winter/wet season. This species is concentrated in more brackish waters to the west of the RVARC site in the dry season. The Ryde Avenue site is within the species historic range, but Longfin Smelt are now infrequently detected in the southeastern portion of the Delta. This species is possibly present in the wet season but not expected during the dry season.

References

Allen, M.A. and T.J. Hassler. 1986. Species Profiles: Life Histories and Environmental Requirements of Coastal Fishes and Invertebrates (Pacific Southwest) Chinook Salmon. U.S. Fish and Wildlife Services. Bio. Report 82 (11.49) U.S. Army Corps of Engineers, TR EL-82-4. 26 pp.

Bailey, E.D. 1954. Time pattern of 1953-54: Migration of salmon and steelhead into the upper Sacramento River. Calif. Dept. Fish and Game, Region 1, Redding, CA.

Barbour, R. W., and W. H. Davis. 1969. Bats of America. University of Kentucky Press, Lexington, 285 pp.

Barnhart, R.A. and D.C. Hillemeier. 1994. Summer Habitat Utilization by Adult Spring Chinook Salmon and Summer Steelhead, South Fork Trinity River, California. California Cooperative Fishery Research Unit, Humbolt State University. Final Report December 1994.

Baskerville-Bridges, B., J.C. Lindberg, J.V. Eenennaam, and S.I. Doroshov. 2004b. Delta smelt research and culture program 5-year summary, 1998-2003. University of California, Davis, California.

Beedy, E. C., and Hamilton, W. J., III. 1999. Tricolored Blackbird (Agelaius tricolor), in The Birds of North America (A. Poole and F. Gill, eds.), no. 423. Birds N. Am., Philadelphia.

Bennett, W.A. 2005. Critical assessment of the delta smelt population in the San Francisco Estuary, California: San Francisco Estuary and Watershed Science 3(2). Available at: http://escholarship.org/uc/item/0725n5vk.

Bilski, R., J. Shillam, C. Hunter, M. Saldate, and E. Rible. 2010. Emigration of Juvenile Chinook Salmon (Oncorhynchus *tschawytscha*) and Steelhead (*Oncorhynchus mykiss*) in the Lower Mokelumne River, December 2009 through 2010. East Bay Municipal Utility District, 1 Winemasters Way, Unit K, Lodi, Ca. 39 pp.

Bloom, P.H. 1980. The status of Swainson's Hawk in California, 1979. Federal Aid in Wildlife Restoration, Project W-54-R-12, Non-Game Wildlife Investigations. Job Final Report 11-8.0. 42 pp.

CalFlora. 2015. Wild California Plant database. Available at: http://www.calflora.org/. Accessed: March 3, 2015.

California Department of Fish and Game (CDFG). 1994. Distribution, Status, and Management of Townsend's Big-Eared Bat in California. BMCP Technical Report No. 96-7. Pierson, E.D., and Rainey, W.E., contributors. Available at: http://www.dfg.ca.gov/wildlife/nongame/publications/bm_research/docs/96_07.pdf. Accessed April 6, 2015.

California Department of Fish and Game (CDFG). 1998. A Status Review of the Spring-Run Chinook Salmon (*Oncorhynchus tshawytscha*) in the Sacramento River Drainage Candidate Species Status Report 98-01.

California Department of Fish and Game (CDFG). 2000. California Wildlife Relationships System: Townsend's Big-Eared Bat. California's Wildlife. Vol. I-III. Zeiner, D.C., W.F. Laudenslayer, Jr., K.E.Mayer, and M. White, editors. 1988-1990.

California Department of Fish and Game (CDFG). 2007. California Swainson's Hawk Inventory: 2005-2006. UC Davis Wildlife Health Center. 2007 Final Report. P0485902. May 31. Available: file:///C:/Users/Jacob/Downloads/RAP-final-report-form-2007.pdf.

California Department of Fish and Game (CDFG). 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Shuford, W. D. and Gardali, T., editors. Western Field Ornithologists, Camrillo, California. Available at: https://www.dfg.ca.gov/wildlife/nongame/ssc/birds.html. Accessed April 6, 2015.

California Department of Fish and Wildlife (CDFW). 2015. California Natural Diversity Database, RareFind Version 5.0. Available at: http://www.dfg.ca.gov/biogeodata/cnddb/mapsanddata.asp. Accessed: March 6, 2015.

Cramer Fish Sciences (CFS). 2012. Juvenile Salmonid Out-migration Monitoring at Caswell Memorial State Park in the Lower Stanislaus River, California. 2010-2011 Biannual Report. Prepared for U.S. Fish and Wildlife Service's Comprehensive Assessment and Monitoring Program. Grant No. 81332 6G008. 48 pp.

California Native Plant Society (CNPS). 2014. Rare, Threatened, and Endangered Plants of California database. Available at: http://www.rareplants.cnps.org/. Accessed: March 3, 2015.

Cook, L. F., Toft, C. A. 2005. Dynamics of extinction: population decline in the colonially nesting Tricolored Blackbird *Agelaius tricolor*. *Bird Conservation International* 15: 73-88.

Cramer Fish Sciences (CFS). 2012. Juvenile Salmonid Out-migration Monitoring at Caswell Memorial State Park in the Lower Stanislaus River, California. 2010-2011 Biannual Report. Prepared for U.S. Fish and Wildlife Service's Comprehensive Assessment and Monitoring Program. Grant No. 81332 6G008. 48 pp.

Craig, R. B. 1978. An analysis of the predatory behavior of the Loggerhead Shrike. Auk 95:221–234.

Fisher, F.W. 1994. Past and present status of Central Valley chinook salmon. Conserv. Biol. 8: 870–873

Gervais, J. A., Rosenberg, D. K., and Anthony, R. G. 2003. Space use and pesticide exposure risk of male Burrowing Owls in an agricultural landscape. J. Wildlife Mgmt. 67:156–165.

Grimaldo, L.F., T. Sommer, N. Van Ark, G. Jones, E. Holland, P. Moyle, B. Herbold, and P. Smith. 2009. Factors affecting fish entrainment into massive water diversions in a tidal freshwater estuary: Can fish losses be managed? North American Journal of Fisheries Management 29:1253–1270.

Grinnell, J., and Wythe, M. 1927. Directory to the bird-life of the San Francisco Bay region. Pac. Coast Avifauna no. 18.

Grinnell, J., and Miller, A. H. 1944. The distribution of the birds of California. Pac. Coast Avifauna no. 27.

Hallock, R.J., W.F. Van Woert, and L. Shapovalov. 1961. An evaluation of stocking hatchery reared steelhead rainbow trout (Salmo gairdnerii gairdnerii) in the Sacramento River system. California Department of Fish and Game Bulletin 114. 74pp

Healey, M.C. 1991. Life history of Chinook salmon (*Oncorhynchus tshawytscha*). Pages 311-393 in C. Groot and L. Margolis, editors. Pacific Salmon Life Histories. UBC Press, Vancouver, BC.

Heublein J.C., J.T. Kelly, C.E. Crocker, A.P. Klimley, and S.T. Lindley. 2009. Migration of green sturgeon Acipenser medirostris, in the Sacramento River. Environmental Biology of Fishes 84(3): 245-258.

Hill, Stephen R. 2013. Hibiscus, in Jepson Flora Project (eds.) Jepson eFlora. Available at: http://ucjeps.berkeley.edu/cgi-bin/get_IJM.pl?tid=91751. Accessed: March 5, 2015

Hobbs, J. A., W. A. Bennett, J. Burton, and M. Gras. 2007. Classification of larval and adult delta smelt to nursery areas by use of trace elemental fingerprinting. Transactions of the American Fisheries Society 136:518–527.

Horizon Water and Environment (Horizon). 2015a. Biological Resources Report for the Rio Vista Army Reserve Center. Prepared California Department of General Services. Draft Report. February.

Horizon Water and Environment (Horizon). 2015b. Biological Resources Report for the 845 Ryde Avenue Stockton, San Joaquin County. Prepared California Department of General Services. Draft Report. March.

ICF Jones & Stokes. 2010. Hatchery and Stocking Program Environmental Impact Report/Environmental Impact Statement. Final. January. (ICF J&S 00264.08) (SCH #2008082025). Sacramento, CA. Prepared for the California Department of Fish and Game and U.S. Fish and Wildlife Service, Sacramento, CA.

Interagency Ecological Program for the San Francisco Bay/Delta Estuary (IEP). 2015. An updated conceptual model of Delta Smelt biology: our evolving understanding of an estuarine fish. Technical Report 90. January, 2015.

Jennings, M.R. and M.P. Hayes. 1994. Amphibian and Reptile Species of Concern in California. Final Report to the California Department of Fish and Game Inland Fisheries Division.

Kimmerer, W. J. 2002. Effects of freshwater flow on abundance of estuarine organisms: physical effects or trophic linkages? Marine Ecology Progress Series 243:39–55.

Lindley S.T., M.L. Moser, D.L. Erickson, M. Belchik, D.W. Welch, E. Rechisky, J.T. Kelly, J. Heublein, and A.P. Klimley. 2008. Marine migration of North American green sturgeon. Trans. Am. Fish. Soc. 137: 182-194.

MacWhirter, R.B., and Bildstein, K.L. 1996. Northern Harrier (Circus cyaneus), in the Brids of North America (A. Poole and F. Gill, eds.), no. 210. Acad. Nat. Sci., Philadelphia.

Mager, R.C., S.I. Doroshov, J.P. Van Eenennaam, and R.L. Brown. 2004. Early life stages of delta smelt. American Fisheries Society Symposium 39:169-180.

Massa, D., J. Bergman, and B. Kreb. 2010. Lower Yuba River Accord Monitoring and Evaluation Plan. Annual Escapement Survey Report. Prepared for the Lower Yuba River Accord River Planning Team. 2009-2010 Annual Report. 26p.

McEwan, D. 2001. Cenral Valley Steelhead in Contributions to the biology of Central Valley salmonids. R.L. Brown (ed.). CDFG, 1-43.

McEwan, D. and T.A. Jackson. 1996. Steelhead Restoration and Management Plan for California. Department of Fish and Game.

Merz, J.E., S. Hamilton, P.S. Bergman, and B. Cavallo. 2011. Spatial perspective for delta smelt: a summary of contemporary survey data. California Fish and Game 97(4):164–189.

Merz, J. E., Bergman, P. S., Melgo, J. F., & Hamilton, S. 2013. Longfin smelt: spatial dynamics and ontogeny in the San Francisco Estuary, California. California Fish and Game 99(3):122-148.

Miller, J.A., A. Gray and J. Merz. 2010. Quantifying the contribution of juvenile migratory phenotypes in a population of Chinook salmon *Oncorhynchus tshawytscha*. Marine Ecology Progress Series 408: 227–240.

Montgomery, D.R., E.M. Beamer, G.R. Pess, and T.P. Quinn. 1999. Channel type and salmonid spawning distribution and abundance. Canadian Journal of Fisheries and Aquatic Sciences 56: 377-387.

Moyle, P.B., B. Herbold, D.E. Stevens, and L.W. Miller. 1992. Life history and status of delta smelt in the Sacramento-San Joaquin Estuary, California. Transactions of the American Fisheries Society 121:67–77.

Moyle, P.B., R.M. Yoshiyama, J. E. Williams, and E. D. Wikramanayake. 1995. Fish Species of Special Concern in California, second edition. Final report to California Department of Fish and Game. Contract 2128IF. Sacramento, CA

Moyle, P.B. 2002. Inland fishes of California, 2nd edition. University of California Press, Berkeley, CA.

Moyle P.B., R.D. Baxter, T. Sommer T.C. Foin, and S.A. Matern. 2004. Biology and population dynamics of Sacramento splittail (Pogonichthys macrolepidotus) in the San Francisco Estuary: a review. San Francisco Estuary and Watershed Science2(2) (May 2004), Article 3. Available: http://repositories.cdlib.org/jmie/sfews/vol2/iss2/art3. Accessed: April 4, 2013.

Mulchaey, B., and J. Setka. 2007. Salmonid Survey Spawning Report, October 2006 Through March 2007, Mokelumne River, California. Mimeo Report for East Bay Municipal Utility District, Lodi, California. 16 pp.

Narum, S., et al. 2008. Iteroparity in Complex Mating Systems of Steelhead *Oncorhynchus mykiss* (Walbaum). Journal of Fish Biology 72:45-60.

National Marine Fisheries Service (NMFS). 2008. Proposed Designation of Critical Habitat for the southern Distinct Population Segment of North American Green Sturgeon Draft Biological Report. September.

National Marine Fisheries Service (NMFS). 2009. Public Draft Recovery Plan for the Evolutionarily Significant Units of Sacramento River Winter run Chinook Salmon and Central Valley Spring-run Chinook Salmon and the Distinct Population Segment of Central Valley Steelhead. Sacramento Protected Resources Division. October.

National Marine Fisheries Service (NMFS). 2012. Draft Environmental Assessment for Nonessential Experimental Population Designation and 4(d) Take Provisions for Reintroduction of Central Valley Spring-Run Chinook Salmon to the San Joaquin River Below Friant Dam. Protected Resources Division. November.

201Pascual MA, P. Bentzen, C. Riva Rossi, G. Mackey, M. Kinnison, and R. Walker. 2001. First documented case of anadromy in a population of introduced rainbow trout in Patagonia, Argentina. Transactions of the American Fisheries Society. 130: 53–67.

Pruitt, L. 2000. Loggerhead Shrike status assessment. U.S. Fish and Wildlife Service. Bloomington, IN

Rosenberg, D. K., and Haley, K. L. 2004. The ecology of Burrowing Owls in the agroecosystem of the Imperial Valley, California. Studies Avian Biol. 27:120–135.

Rosenfield, J. and R. Baxter. 2007. Population dynamics and distribution patterns of longfin smelt in the San Francisco estuary. Transactions of the American Fisheries Society 136:1577–1592.

Russian River Estuary Management Project (RREMP). 2010. Draft Environmental Impact Report. Prepared for Sonoma County Water Agency.

Sauer, J. R., Schwartz, S., and Hoover, B. 1996. The Christmas Bird Count Home Page, version 95.1. Patuxent Wildlife Rescue Center, Laurel, MD. Available: http://birds.audubon.org/christmas-bird-count.

Sauer, J. R., Hines, J. E., and Fallon, J. 2005. The North American Breeding Bird Survey, results and analysis 1966–2004, version 2005.2. USGS Patuxent Wildl. Res. Ctr. Available: https://www.pwrc.usgs.gov/bbs/.

Seesholtz, A. M., M. J. Manuel, and J. P. Van EEnennaam. 2014. First documented spawning and associated habitat conditions for green sturgeon in the Feather River, California. Environmental Biology of Fishes 98(3):905-912.

Shuford, W. D., and Gardali, T., editors. 2008. California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California. Studies of Western Birds. Western Field Ornithologists and California Department of Fish and Wildlife.

Sommer, T, Armor, C, Baxter, R, Breuer, R, Brown, L, Chotkowski, M, Culberson, S, Feyrer, F, Gingras, M, Herbold, B, Kimmerer, W, Mueller-Solger, A, Nobriga, M, Souza, K. 2007. The collapse of pelagic fishes in the upper San Francisco Estuary. Fisheries 32(6):270-277.

Sommer, T., F. Mejia, M. Nobriga, F. Feyrer, and L. Grimaldo. 2011. The spawning migration of delta smelt in the upper San Francisco Estuary. San Francisco Estuary and Watershed Science 9(2). Available at: http://www.escholarship.org/uc/item/86m0g5sz.

Sommer, T., and F. Mejia. 2013. A place to call home: a synthesis of delta smelt habitat in the upper San Francisco Estuary. San Francisco Estuary and Watershed Science 11(2). Available at: http://www.escholarship.org/uc/item/32c8t244.

Stillwater Sciences. 2014. A conceptual framework for understanding factors limiting Pacific lamprey production in the Eel River basin. Prepared by Stillwater Sciences, Arcata, California for Wiyot Tribe, Loleta, California

Thompson, B. C. 1975. A new prey-pursuit behavior by white-tailed hawks. Auk 92:395.

Trulio, L. 1997. Burrowing owl demography and habitat use at two urban sites in Santa Clara County, California. Raptor Res. Rep. 9:84-89.

U.S. Bureau of Reclamation (USBR). 2004. Long-term Central Valley Project and State Water Project Operations Criteria and Plan Biological Assessment. USDI Bureau of Reclamation, Mid-Pacific Region, Sacramento, California.

U.S. Department of Agrilculture (USDA). 2015. Plants Profile database. Natural Resources Conservation Service. Available at: http://plants.usda.gov/core/profile?symbol=LIAU6. Accessed: April 2, 2015.

U.S. Fish and Wildlife Service (USFWS). 1995. Sacramento-San Joaquin Delta Native Fishes Recovery Plan. U.S. Fish and Wildlife Service, Portland, Oregon.

U.S. Fish and Wildlife Service (USFWS). 2015. Species Fact Sheet: Pacific Lamprey, *Lampetra tridentata*. Accessed on June 11, 2015 at: http://www.fws.gov/oregonfwo/Species/Data/PacificLamprey/

Wampler, P.L. 1986. Development of Habitat Preference Criteria for Holding Adult Spring Chinook Salmon. Prepared for U.S. Fish and Wildlife Service. November 1986.

Wang, J.C.S. 1986. Fishes of the Sacramento-San Joaquin Estuary and adjacent waters, California: A guide to the early life histories. Interagency Ecological Program of the Sacramento-San Joaquin Estuary, Technical Report 9.

Wang, J.C.S. 1991. Early life stages and early life history of the delta smelt, *Hypomesus transpacificus*, in the Sacramento-San Joaquin estuary with comparison of early life stages of the longfin smelt, *Spirinchus thaleichthys*. U.S. Army Corps of Engineers, Technical Report FS/BIO-IATR/91-28.

Wang, J.C.S. 2007. Spawning, early life stages and early life histories of the Osmerids found in the Sacramento-San Joaquin Delta of California. U.S. Department of the Interior, Bureau of Reclamation, Mid-Pacific Region, Byron, California. Tracy Fish Facilities Studies, Volume 38, 72 p. plus appendices.

Ward, P.D., T.R. McReynolds, and C.E. Garman. 2003. Butte Creek Spring-Run Chinook Salmon, *Oncorhynchus tshawytscha* Pre-Spawn Mortality Evaluation, 2003. Chico, California: California Department of Fish and Game. Inland Fisheries Administrative Report No. 2004-5.

Willett, G. 1933. A revised list of the birds of southwest-ern California. Pac. Coast Avifauna 21.

Withler, I.L. 1966. Variability in life history characteristics of steelhead trout (*Salmo gairdneri*) along the Pacific coast of North America. J. Fish. Res. Board of Canada. 23(3), 365-393.

Woodbridge, B. 1998. Swainson's Hawk (*Buteo swainsoni*). The Riparian Bird Conservation Plan. California Partners in Flight: a strategy for reversing the decline of desert-associated birds in California. Available: http://www.prbo.org/calpif/htmldocs/species/riparian/swainsons_hawk.htm

Workman, M. L. 2001. Lower Mokelumne River Upstream Fish Migration Monitoring conducted at Woodbridge Irrigation District Dam August 2000 through April 2001. EBMUD report. Lodi Fisheries and Wildlife Division.

Yosef, R. 1996. Loggerhead Shrike (Lanius ludovicianus) in The Birds of North America, No. 231 (A. Poole Ed.) Cornell Lab of Ornithology, Ithaca, New York.

Yoshiyama, R.M., F.W. Fisher, and P.B. Moyle. 1998. Historical Abundance and Decline of Chinook Salmon in the Central Valley Region of California. North American Journal of Fisheries Management 18: 487-521.

Appendix F
BEST MANAGEMENT PRACTICES FOR PILE REMOVAL AND DISPOSAL

This appendix contains Best Management Practices (BMPs) for pile removal and disposal.

APPENDIX F

Washington Department of Natural Resources
Puget Sound Initiative – Derelict Creosote Piling Removal

Best Management Practices
For Pile Removal & Disposal

STRIKE-OUT AND UNDERLINE TEXT INDICATE MODIFICATION FOR INCORPORATION IN THE DELTA RESEARCH STATION EIR/EIS

The following Best Management Practices (BMPs) are adapted from EPA guidance (2005), Washington State Department of Transportation (WSDOT) methods and conservation activities as included in Joint Aquatic Resources Protection Application (JARPA) 2005, and Washington State Department of Resources (WADNR) "Standard Practice for the Use and Removal of Treated Wood and Pilings on and from State-Owned Aquatic Lands" 2005.

The purpose of these BMPs is to control turbidity and sediments re-entering the water column during pile removal, and prescribe debris capture and disposal of removed piles and debris.

BMP 1. PILE REMOVAL

A. Vibratory extraction

1) This is the preferred method of pile removal.

2) The vibratory hammer is a large mechanical device (5-16 tons) that is suspended from a crane by a cable. The hammer is activated to loosen the piling by vibrating as the piling is pulled up. The hammer is shut off when the end of the piling reaches the mudline. Vibratory extraction takes approximately 15 to 30 minutes per piling depending on piling length and sediment condition.

3) Crane operator shall be trained to remove pile slowly. This will minimize turbidity in the water column as well as sediment disturbance.

4) Operator will "Wake up" pile to break up bond with sediment.

- Vibrating breaks the skin friction bond between pile and soil.
- Bond breaking avoids pulling out a large block of soil – possibly breaking off the pile in the process.
- Usually there is little or no sediment attached to the skin of the pile during withdrawal. In some cases material may be attached to the pile tip, in line with the pile.

B. Direct Pull

1) This method is optional if the contractor determines it to be appropriate for the substrate type and structural integrity of the piling.

2) Pilings are wrapped with a choker cable or chain that is attached at the top to a crane. The crane pulls the piling directly upward, removing the piling from the sediment.

C. Clamshell Removal

1) Broken and damaged pilings that cannot be removed by either the vibratory hammer or direct pull shall be removed with either a clamshell bucket or environmental clamshell.

2) A clamshell is a hinged steel apparatus that operates like a set of steel jaws. The bucket is lowered from a crane and the jaws grasp the piling stub as the crane pulls up.

3) The size of the clamshell bucket will be minimized to reduce turbidity during piling removal.

4) The clamshell bucket will be emptied of material onto a contained area on the barge before it is lowered into the water.

D. Cutting

1) Is required if the pile breaks off at or near the existing substrate and cannot be removed using a clamshell bucket.

2) Prior to commencement of the work the contractor will assess the condition of the pilings. Contractors will create a log outlining the location and number of pilings that need to be cut or broken off and have this log available to the agencies upon request.

~~3) Washington State Department of Fish and Wildlife (WDFW) will be consulted to determine if this is the preferred option at any specific site.~~

~~4)~~3) Every attempt will be made to completely remove the piling in its entirety before cutting. If a pile is broken or breaks above the mudline during extraction, one of the methods listed below should be used to cut the pile.

a. A chain should be used, if practical, to attempt to entirely remove the broken pile. (BMP 1-C)

b. If the entire pile cannot be removed, the pile should be cut at or below the mudline by using a pneumatic underwater chainsaw. Project-specific requirements for cutoff will be set by the project manager in consultation with ~~WDFW and Washington Department of Ecology~~the Regional Water Quality Control Board, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and/or National Marine Fisheries Service considering the mudline elevation and the presence of contaminants in the sediment. Generally, in subtidal areas with contaminated sediments, pilings should be cut off at the mudline to minimize disturbance of the sediment. In dry, intertidal areas, piling should be cut off at least 1 foot below the mudline. In uncontaminated, subtidal areas, piling should be cut off at least 1 foot below the mudline.

c. Piles shall be cut off at lowest practical tide condition and at slack water. This is intended to reduce turbidity due to reduced flow and short water column through which pile must be withdrawn.

d. In deep subtidal areas, if the piling is broken off below mudline greater than 1 foot, the piling may remain. In intertidal and shallow subtidal areas, seasonal raising and lowering of the beach could expose the pilings above the mudline and leach out PAH's or other contaminants. In this case, the piling should be cut off at least two feet below the mudline if it is accidentally broken off during removal.

e. Depending on future use, the removal contractor will provide the location of the broken pile using GPS. This will be necessary as part of debris characterization should future dredging be a possibility in the area of piling removal.

BMP 2. BARGE OPERATIONS, WORK SURFACE, CONTAINMENT

A. Barge grounding will not be permitted within project areas over eelgrass beds.

B. Work surface on barge deck or pier shall include a containment basin for pile and any sediment removed during pulling.

1) Containment basin may be constructed of durable plastic sheeting with sidewalls supported by hay bales or support structure to contain all sediment. Water run off can return to the waterway.

2) Work surface on barge deck and adjacent pier shall be cleaned by disposing of sediment or other residues along with cut off piling as described in BMP #3.C below.

3) Containment basin shall be removed and disposed in accordance with BMP #3.C below or in another manner complying with applicable federal and state regulations.

4) Upon removal from substrate the pile shall be moved expeditiously from the water into the containment basin. The pile shall not be shaken, hosed-off, left hanging to drip or any other action intended to clean or remove adhering material from the pile.

BMP 3. DISPOSAL OF PILING, SEDIMENT AND CONSTRUCTION RESIDUE

A. Pulled pile shall be placed in a containment basin to capture any adhering sediment. This should be done immediately after the pile is initially removed from the water.

1) Utilize basin set up on the barge deck or adjacent pier

2) Basin may be made of hay bales and durable plastic sheeting.

B. Piling shall be cut for disposal ~~into 4' lengths~~ with standard chainsaw, at the discretion of the contractor.
   1) All sawdust and cuttings shall be contained in the container.

C. Cut up piling, sediments, construction residue and plastic sheeting from containment basin shall be packed into container. For disposal, ~~ship to Rabanco/Regional Disposal Subtitle D Landfill in Roosevelt, Washington~~ the Contractor ~~.~~shall comply with the Department of Toxic Substances Control alternative management standards for Treated Wood Waste found in California Code Regulations (Cal. Code Regs.) Title 22, Division 4.5, Chapter 34. If temporary storage of treated wood waste will occur on-site, it shall be listed on a Hazardous Materials Business Plan.

BMP 4. DEBRIS CAPTURE IN WATER

A. A floating surface boom shall be installed to capture floating surface debris. Debris will be collected and disposed of along with cut off piling as described in BMP #3.C above.

B. The floating surface boom shall be equipped with absorbent pads to contain any oil sheens. Absorbent pads will be disposed as described in BMP #3.C above.

BMP 5. RESUSPENSION/TURBIDITY

A. Crane operator shall be trained to remove pile from sediment slowly.

B. Work shall be done in low current, to the extent possible.

C. Removed piles shall be placed in a containment facility.

D. Sediments spilled on work surfaces shall be contained and disposed of with the pile debris at permitted upland disposal site.

E. Holes remaining after piling removal shall not be filled.

BMP 6. PROJECT OVERSIGHT

A. ~~WADNR~~ Lead Agency will have a project manager or other assigned personnel on site. Oversight responsibilities will include, but are not limited to the following:

   1) Water quality monitoring to ensure turbidity levels remain within required parameters.

   2) Ensure contractor follows BMPs

   3) Ensure contractor is in compliance with contract and permit requirements

   4) Ensure correct structures are removed

   5) Maintain contact with regulatory agencies should issues or emergencies arise.

Appendix G
CDFW Protocols for Decontamination and Monitoring of Aquatic Invasive Species

This appendix contains CDFW protocols for decontamination and monitoring of aquatic invasive species (AIS).

Aquatic Invasive Species Monitoring at CDFW Hatcheries

California Department of Fish and Game

February 2013

Invasive Species

"Invasive species" are defined as plants or animals that cause environmental or economic harm, or harm to human health. Invasive species tend to be adaptable to new environments and multiply quickly. It is difficult to predict where an invasion will occur, which species may invade, or the consequences of their invasion; therefore, to protect facilities and the environment it is necessary to monitor for invasive species so that if an invasion does occur, efforts can be made quickly to prevent their spread within an area and to adjacent areas.

Invasive species threaten the diversity and abundance of native and desirable non-native species through competition for resources, predation, parasitism, hybridization, transmission of diseases, and/or causing physical or chemical changes to the environment. Invasive species also threaten man-made systems and structures, including water delivery and flood protection systems, agriculture, and developed lands.

Invasive species are commonly introduced into new areas as a result of human activities. Natural barriers, such as mountains, oceans, etc., historically confined species to their native range. Commerce and the advent of travel between remote locations has circumvented natural barriers, and trains, planes, ships, and vehicles are capable of transporting organisms great distances, often unknowingly and unintentionally. Hatchery activities have the potential to spread invasive species to new waterbodies, as well as between waterbodies, when stocking fish.

Invasive species in hatcheries pose a number of concerns. First, they may become established within a hatchery and impact operations, including clogging pipes, aeration devices, screens, and encrusting equipment, necessitating added maintenance. Second, they may be spread to other hatcheries and/or into the environment along with transfered or planted fish. Alternatively, invasive species may not directly impact operations at a hatchery, and thus go unnoticed, or pass through a hatchery in its source water. Both of these situations present the opportunity for hatchery activities to move invasive species to new environments in transport water, and therefore must also be addressed.

This protocol is limited to monitoring for aquatic invasive species (AIS); however, it is recommended that precautions to prevent the spread of terrestrial invasive species also be taken. This protocol does not address fish health issues or disease prevention. Monitoring for AIS is a component of a comprehensive Hazard Analysis-Critical Control Point (HACCP) Plan, which identifies pathways and preventatives for the introduction of AIS into a hatchery, the spread of AIS within a hatchery, and the release of AIS from a hatchery.

Sources of Aquatic Invasive Species

Many hatcheries use surface water for operation. Surface waters are susceptible to AIS contamination, particularly if accessible for recreation (boating, fishing, etc.). Most of CDFW's anadromous mitigation hatcheries are located below dams and use water directly from an impounded reservoir that allow recreational access. Other hatcheries are located further down-river from reservoirs, or on rivers where recreation occurs, and are also at risk of AIS contamination. Well water pumped directly into a hatchery is at very low risk of being contaminated with AIS.

Other potential pathways for the introduction of AIS into a hatchery include the importation of eggs or fish, or by picking up an AIS on equipment or vehicles in the course of planting fish. These pathways, and all others, should be addressed in a comprehensive HACCP Plan.

Aquatic Invasive Species of Concern, and Aids to Their Identification

AIS believed to pose the greatest threat to California's hatcheries and the environment are quagga mussel, zebra mussel, and New Zealand mudsnail, and the monitoring methods described herin are specific for these three species. Other AIS of concern, including channeled apple snail, Brazilian waterweed, Eurasian watermilfoil, *Hydrilla*, and the algae *Didymosphenia geminata* (also known as didymo or rock snot), are described in Attachment A and should be reported if found. Refer to Attachment A for species descriptions, suitable environmental conditions, known range, and photos to assist in their identification.

QUAGGA MUSSEL AND ZEBRA MUSSEL
Dreissena bugensis and *Dreissena polymorpha*

Quagga and zebra mussels are separate species, but look very similar. The following description applies to both species. These freshwater mussels produce microscopic, free-floating larvae. The larvae eventually settle on surfaces and turn into the shelled adult form.

Species Description:

Body form – Juveniles and adults are 2-shelled (bivalve); may have dark colored "threads" on one edge. Larval life-stage is microscopic and cannot be seen by the unaided eye.

Size – Range in size from microscopic to up to 2" long; free-floating (planktonic) larvae are microscopic.

Color – Shells usually have alternating light and dark brown stripes, but can also be solid light brown to dark brown.

Suitable Environmental Conditions:

Temperature – Survives in water temperatures between 32° F and 88° F.

Moisture – Aquatic, but can survive out of water for weeks under suitable conditions (longest at low temperatures and high humidity).

Substrate – Usually attached to soft and hard surfaces, including aquatic plants, but also known to detach from surfaces and crawl or be carried by water. Small, newly settled mussels feel like gritty sandpaper when attached to a smooth surface. Larger mussels may feel coarser, like a small pebble or sunflower seed. Mussels often adhere to surfaces firmly and when lightly touched may rock back and forth.

Known occurrences in California – San Bernardino, Riverside, San Diego, Imperial, Orange, and San Benito Counties. For current known locations visit http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/maps/CaliforniaDreissenaMap.jpg.

Key Features for Identification:

Quagga and zebra mussels are not the only freshwater bivalve found in California, however they are the only freshwater bivalves that attach to surfaces. In the absence of attachment, a combination of characteristics including their alternating bands of color and evidence of "threads" can be used to identify.

Size and color variation in mussels

Quagga mussel showing 'threads'

NEW ZEALAND MUDSNAIL
Potamopyrgus antipodarum

Small, fresh to brackish water aquatic snail that can be easily overlooked because it often blends in with its surroundings. New Zealand mudsnails are self-reproducing and give birth to live offspring, therefore a single snail can create a population.

Species Description:

- Body form – Single shell that is elongated and spiraled, when fully grown having 5-7 spirals.
- Size – From microscopic up to ¼” long.
- Color – Variable; light to dark brown in color.

Suitable Environmental Conditions:

- Temperature – Survives in waters between 32° F and 83° F.
- Moisture – Aquatic, but can survive for weeks under suitable temperatures and humidity.
- Substrate – Soft (mud, silt, plants, etc.) and hard substrates. Also capable of detaching and floating in the water.
- Known occurrences in California – For current known locations visit http://nas.er.usgs.gov/queries/collectioninfo.aspx?SpeciesID=1008.

Key Features for Identification:

A key feature of live New Zealand mudsnails is the presence of an operculum (flap covering the shell opening). New Zealand mudsnails require expertise to accurately identify. Any snail ¼“ or less should be forwarded for identification (see page 10).

Dead New Zealand mudsnail on metric ruler (5 millimeters = ~¼”). Operculum often absent in dead specimens.

Live New Zealand mudsnail showing operculum and spirals, numbered 1-5.

Dense colony of New Zealand mudsnails attached to the underside of a rock.

Monitoring for Quagga and Zebra Mussels and New Zealand Mudsnail

General Guidelines

Early detection monitoring concentrates efforts on areas where AIS are most likely to be found, rather than by randomly sampling. Attention should be directed to protected areas, such as crevasses, corners, and edges.

Hatchery personnel should always be on the look-out for unfamiliar plants and animals during daily operations. Current maintenace-intensive hatchery operations provide considerable opportunity to watch for AIS. Intensive maintenance could, however, inhibit the detection of AIS. Routine cleaning may prevent organisms from attaching to surfaces, becoming established, growing large enough to detect, or keep them at such low densities that they remain undetected.

In addition to watching for AIS during routine operations, hatcheries must inspect their facilities quarterly for AIS. Inspections provide only a snapshot in time, and do not guarantee that a facility is AIS-free. Increasing the frequency of inspections and using a variety of methods will improve the likelihood that an AIS is detected. In addition, monitoring may be useful in identifying the point of AIS introduction, should an infestation occur.

Because each AIS is different, no one method is effective for detecting all species. A combination of methods, including specialized sampling devices and examination of existing surfaces, is necessary. Monitoring methods and specific directions, as well as proceedures for documenting and reporting monitoring, are provided below.

Monitoring Source Water and Outflow

A means for continuous monitoring of non-well water entering the hatchery is necessary. Detecting AIS in water coming into a hatchery can exclude hatchery activities as the source of an AIS infestation. A portion of the inflow is routed into a flow-through system, referred to as a “biobox”, designed to provide a suitable environment for some AIS species, making their detection possible. In addition, hatchery staff should examine debris, including plants, entrained on intake screens and trash-racks for AIS.

Because hatchery water is released into the environment untreated, AIS may be released as well. Monitoring hatchery outflow samples all the water passing through the hatchery, and is the final opportunity to detect AIS. Outflow monitoring can be achieved using either a biobox, artificial substrates and surface survey for depths three feet and greater, or surface survey for depths less than three feet.

Bioboxes

- ***This method is suitable for detection of quagga and zebra mussels***

Bioboxes are flow-through aquaria, designed specifically to sample for the larval/settlement stage of quagga and zebra mussels. Microscopic larvae are suspended in the water, and upon reaching settlement stage, attach to surfaces. The biobox provides suitable conditions (surface and flow) for this to occur. Flow rates greater than 5 feet/sec inhibit mussel settlement, so a flow-through system must not exceed this velocity.

Location(s):
One biobox will be installed where raw water enters the facility and, if feasible, at each (if more than one) hatchery outflow, prior to discharge. Bioboxes are not needed on water drawn directly from a well. Bioboxes should be placed on a stable surface adequate to support its weight. If the water temperature inside the biobox is more than 2° F above the hatchery water temperature then the biobox must be shaded. Bioboxes should be located in areas that will not be damaged by water if the box were to overflow. Individual hatcheries may need to modify the Biobox during installment to adequately meet all flow and temperature requirements. There may also be infrastructure modifications needed to connect the Biobox to individual hatcheries inflow and outflow water supply.

Monitoring frequency:
Bioboxes should be checked as needed to ensure they are operating correctly and maintaining the appropriate flow rate. A visual and tactile (touch) examination is conducted quarterly.

Requirements for biobox design:
- Minimum internal volume of 12 gallons
- Flow rate of 1.32 gallons/minute

The following design specifications meet the biobox requirements, above.

<u>Biobox Construction and Assembly (Figure 1)</u>
(Designed by Jody Rightmier, CDFW Yreka Screen Shop)

BIO-BOX MATERIALS PARTS LISTING: material to cover single box

1” PVC Ball Valve Female threaded ends, quarter turn design…..1 each

Nipple TBE SCH 80 1” x close PVC…………………………………..1 each

1” PVC 90 degree elbow slip x slip SCH 40…………………………1 each

1” pipe x MIPT PVC insert male adapter………………………………2 each

1’ PVC Tank adapter SOCXFPT NPRN Gasket……………………...2 each

1’ x 2” (length) SCH 40 PVC pipe………………………………………1 each

22 x 17 x 12” Grey Bins and Divider box………………………………1 each

Snap F/DC3000 Bins & Divider box cover……………………………1 each

Short Divider F/DC3080 (sold in 6 pk). Bins & Divider box…………3 each/box

ER308L 3/32 x 36” TIG welding rod……………………………………1 each

1/2 “ bolt size medium flat washer 18-8 stainless/steel………………6 each

The plates slide down into “channel guides” on either side of the interior walls of the box (Figure 2) and water flows over and under the plates as it passes through the box. Plates are kept submerged with stainless steel wire and washers that allow for removal when inspecting the plates. Flow into the box is regulated by a valve on the incoming water line. The outlet is an overflow pipe that ensures the water level in the box remains at a constant level. All interior surfaces and plates are roughed up with fine (150-180 grit) sandpaper to maximize suitability for settlement.

Figure 2. Interior view of biobox plates that provide suitable surfaces for mussel settlement.

Monitoring procedure:

To inspect biobox, begin by closing the inflow valve. One at a time, carefully remove each plate. Do not set the plates down as small or delicate organisms could be crushed. Hold the plate over a separate container to catch any dislodged organisms, and visually inspect it. Use a magnifying glass if necessary. Next, gently run fingers over the plates to feel for any organisms. Very small quagga or zebra mussels may be more easily felt than seen. Do not leave the plates out of the water so long that they dry; examine and return to the water immediately if no suspect organisms are found. When finished with the first plate, reinsert it and inspect the remaining plates the same way. Also examine the inner walls of the biobox. If walls are transparent, look in from the outside. If not, view from above. Next, gently run fingers over the walls as with the plates. When finished, open the valve to resume appropriate flow.

Artificial Substrates

- ***This method is suitable for detection of quagga and zebra mussels***

If it is not feasible to use a biobox at the outflow, then a minimum of two (2) artificial substrates should be deployed in settling ponds.

ARTIFICIAL SUBSTRATE MATERIALS PARTS LISTING: material to cover single substrate

(4) 6” x 6” x 0.25” black/grey PVC with 1” hole through center

(5) 1.5” x 1.375” (35mm) exterior diameter PVC or ABS tube

(1) 8.5” x 0.8125” (21 mm) exterior diameter PVC or ABS tube

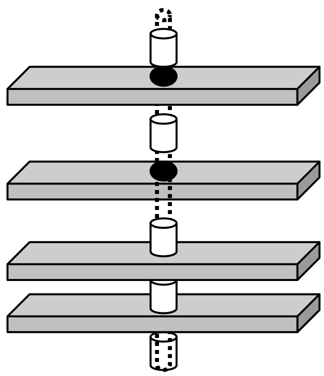
~25 ft plastic coated cable or rope

Some form of attachment to keep plates from floating up

Weight

Laminated label with your contact information

To assemble the substrate, run the cable or rope through the 8.5” tube and secure at one end. From the loose end of the rope string on the remaining pieces, alternating between the short segments of tube and the plates, beginning and ending with the short tubes (see figure). Secure the top tube to the rope to prevent the pieces from floating up. If necessary, attach a weight to the bottom of the assembly. Attach the label to the cable where the cable is secured to the structure.



California Department of Fish and Game

Biological Research

PLEASE DO NOT DISTURB

Deployment of the Artificial Substrates:

Depending on water clarity and depth, the artificial substrate should be set below the euphotic zone (below the depth of light penetration) or 6 feet, whichever is deeper, and at least two few feet above the bottom. One to two substrates are deployed per site. If the site is shallower than 2 m, then raise the substrate about 0.5 m (2 ft) off of the bottom. Record the actual sampling depth. At sites that are deep and have little vertical mixing, a second substrate is installed at a depth of approximately 15 meters (50 feet) below the surface (or 1 meter off the bottom if the depth is less than 15 meters).

Monitoring procedure:

To check an artificial substrate, first carefully lift it out of the water and place it in a large plastic tub (the tub will capture any mussels that fall off). Avoid knocking the substrate as you pull it out of the water because you may dislodge or crush any attached mussels. First visually inspect each plate (top, bottom, and sides), the spacers, the cable and the weight. Use a magnifying glass if necessary. Next, gently run fingers over the plates to feel for any organisms. Very small quagga or zebra mussels may be more easily felt than seen. After looking closely, attempt to gently push any attached organism that might be a mussel. Freshwater limpets and snails easily move or slide across the plate. Zebra and quagga mussels stick in place or are more securely attached. In all cases, if in doubt, bag it.

If no mussels are detected, lower the substrate back into the water. Zebra and quagga mussels are more likely to attach to a substrate that has some algal growth, however if the substrate becomes too heavily coated it may be unsuitable for mussel settlement. As necessary, gently remove heavy accumulations of algae to maintain suitable conditions for settlement.

Monitoring In-Hatchery and Outflow

In addition to monitoring at the inflow and outflows, surface surveys must be conducted within the hatchery facilities and outflows if a biobox is not used.

Surface Surveys

- ***This method is suitable for detection of quagga and zebra mussels and New Zealand mudsnail***

When areas are dewatered during hatchery operations, surfaces must be inspected for AIS. Many AIS blend in with their surroundings and prefer sheltered areas, so close inspection is necessary and most easily conducted when dewatered. In addition, surfaces and structures within the hatchery must be inspected quarterly. Specific instruction on how to inspect surfaces is provided below.

Locations and frequency:
Inspect 5% of dewatered surfaces as dewatering occurs. In addition, inspect 5% of surfaces throughout the facility each quarter. For example, if there are ten raceways, inspect the safely accessible surfaces equivalent to one-half of a raceway (10 raceways x 0.05 = 0.5 raceways), divided among the ten raceways. Spreading the 5% over all of the raceways increases the chance of finding an AIS if it is in the facility.

The 5% applies to surfaces, outflow settling ponds (if applicable) as well as equipment such as screens, tubing, lines, etc. As with all forms of early detection monitoring, the more you look, the more likely you are to find something if it is there. Always err on exceeding the minimum sampling requirement, rather than just meeting it.

If monitoring is conducted outside of secured areas of the hatchery there is greater potential that they are infested with invasive species. Do not allow gear that will be returned to the hatchery (including, but not limited to boots, waders, nets, etc) to contact the settling ponds. In these cases gear dedicated to this purpose should be used and prominently labeled, and stored separately from other gear. If dedicated gear is not feasible, then gear must be decontaminate after monitoring outside of the hatchery according to the following protocols:

http://www.dfg.ca.gov/invasives/quaggamussel/

Monitoring procedure:

Carefully examine surfaces both visually and tactilely by running fingers over them, with particular attention given to protected areas such as crevasses, corners, and edges, and areas where fish are excluded from. If needed, use a magnifying glass, flashlight, or other aides to thoroughly examine.

Summary of Monitoring Methods and Minimum Monitoring Frequencies

	Biobox	Surface Survey	Artificial Substrates
Inflow	Quarterly (January, April, July, October)	N/A	N/A
In hatchery	N/A	Dewatering and 5% Quarterly (January, April, July, October)	N/A
Outflow	Quarterly (January, April, July, October)	5% Quarterly (January, April, July, October)	Quarterly (January, April, July, October)

Specimen Identification and Collection

If a suspect AIS is detected either during daily operations or monitoring, immediately contact your CDFW Regional AIS Scientist (page 12). To aid their identification, first take a close-up digital photograph of the organism next to a ruler so that there is a size reference. Next, collect the specimen(s) and place in a container where it will not be crushed and add enough 70% ethanol to cover it. Label the sample with hatchery name, location within the hatchery, date, suspected species, and the name of who collected it. If the entire substrate needs to be retained, place the entire unit in a plastic bag. E-mail the photos to the CDFW Regional AIS Scientist and they will try to identify the specimens from the photographs. If they are unable to identify the species from photographs, they may request the specimen(s) or substrate.

Data Recording and Reporting

Quarterly monitoring is to be conducted during the months of January, April, July, and October. Quarterly monitoring datasheets must be completed to document monitoring, and are to be submitted by the end of the month of monitoring. Absence data is as important to document as presence, so complete and submit a datasheet (electronic form provided) even if no AIS are found. Hatcheries are to send an electronic copy of the datasheet to their respective regional Senior Hatchery Supervisor, Regional AIS Scientist, to the Fisheries Branch Fish Production Program Manager and Hatchery Coordinator via email, and retain the originals on-site. All data will be entered into a centralized monitoring database maintained by the Habitat Conservation Planning Branch AIS Program.

CDFW Regional Office Contacts for AIS Monitoring

Contact information subject to change. For the most up to date information refer to: http://www.nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=4955.

Region 1 – Northern Region

Counties: Del Norte, Humboldt, Lassen, Mendocino, Modoc, Shasta, Siskiyou, Tehama, and Trinity
601 Locust Street, Redding, CA 96001
L. Breck McAlexander
Louis.McAlexander@wildlife.ca.gov
Office: (530) 225-2317
Fax: (530) 225-2381

Region 2 – North Central Region

Counties: Alpine, Amador, Butte, Calaveras, Colusa, El Dorado, Glenn, Lake, Nevada, Placer, Plumas, Sacramento, San Joaquin, Sierra, Sutter, Yolo and Yuba
1701 Nimbus Road, Rancho Cordova, CA 95670
Jason Julienne
Jason.Julienne@wildlife.ca.gov
Office: (916) 358-2895
Fax: (916) 358-2912

Region 3 – Bay Delta Region

Counties: Alameda, Contra Costa, Marin, Napa, Sacramento, San Mateo, Santa Clara, Santa Cruz, San Francisco, San Joaquin, Solano, Sonoma, and Yolo
4001 North Wilson Way, Stockton, CA 95205
Catherine Mandella
Catherine.Mandella@wildlife.ca.gov
Office:(209)942-6107
Fax: (209) 946-6355

Region 4 – Central Region

Counties: Fresno, Kern, Kings, Madera, Mariposa, Merced, Monterey, San Benito, San Luis Obispo, Stanislaus, Tulare and Tuolumne
1234 E. Shaw Avenue, Fresno, CA 93710
Kelley Aubushon
Kelley.Aubushon@wildlife.ca.gov
Office: (559) 243-4017 X-285
Fax: (559) 243-4004

Region 5 – South Coast Region

Counties: San Diego, Orange
3883 Ruffin Road, San Diego, CA 92123
Russell Black
Duane.Black@wildlife.ca.gov
Office: (858) 467-4262

Fax: (858) 467-4299

Counties: Los Angeles, Santa Barbara and Ventura
4665 Lampson Avenue, Los Alamitos, CA 90720
Eloise Tavares
Eloise.Tavares@wildlife.ca.gov
Office: (562) 342-7155
Fax: (562) 342-7153

Region 6 – Inland Deserts Region
Counties: Imperial, Inyo, Mono, Riverside and San Bernardino
P.O. Box 2160, Blythe, CA 92226
David Vigil
David.Vigil@wildlife.ca.gov
Office: (760) 922-4928
Fax: (760) 922-5638

Other Aquatic Invasive Species of Concern

The following species are known to occur in California and should be reported if found. Additional species accounts may be added as warranted.

Animals
- Channeled apple snail

Plants and Algae
- Eurasian watermilfoil
- Brazilian waterweed or Brazilian elodea
- Hydrilla
- Rock snot or didymo

CHANNELED APPLE SNAIL
Pomacea canaliculata

Freshwater aquatic snail. Channeled apple snails leave the water to lay eggs and eat terrestrial vegetation. Eggs hatch and juvenile snails return to the water. Reproduction is dependant on food availability and water temperature, but usually occurs in the early spring and early fall.

Species Description:

Body form – Single shell with compact spirals that are deeply indented, hence the common name “channeled”. Eggs are reddish in color, and loosely attached to each other in masses of 200-600.

Size – Adult shells can reach up to 3” long, individual eggs are 0.09-0.14” in diameter.

Color – Shell color is yellowish to brown.

Suitable Environmental Conditions:

Temperature – Survives in water between 65° F and 90° F.

Moisture – Aquatic, but commonly leaves water to lay eggs and eat. Can survive out of water for several months by closing the opening of its shell and bedding in the soil.

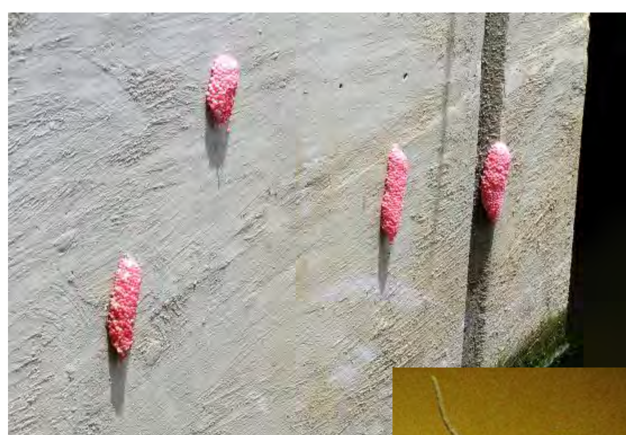
Substrate – Soft (mud, silt, plants, etc.) and hard surfaces.

Known occurrences in California – Lake Miramar, San Diego County, Norton Simon Museum pond, Los Angeles County, and Riverside County near the Salton Sea.

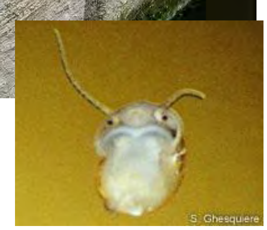
Key Features for Identification:

The large size of adult channeled apple snails and their egg masses is unique. Smaller specimens may be identifiable by their round, deeply indented shell.

Adult channeled apple snail shells



Egg masses



Newly hatched (5 day) channeled apple snail.

EURASIAN WATERMILFOIL
Myriophyllum spicatum

Species Description:

Plant – Reddish-brown or whitish-pink

Stems – Branched and 20-30” long, reddish-brown or whitish-pink.

Leaves – Olive green and occasionally reddish tinted and arranged circularly around the stem in groups of 3-6 (usually 4). Each leaf is less than 2” long, soft, and feather-like. Each leaf has a rib and 14-24 or so slender segments on each side of the rib.

Flowers – Individual flowers are reddish, very small, and many together form spikes several inches long that are held above the water.

Roots – Fibrous, often developed on small pieces broken off larger plant.

Suitable Environmental Conditions:

Temperature – Able to overwinter in frozen lakes and ponds in northern states and Canada; also able to grow in shallow, over-heated bays.

Moisture – Underwater; often found in water 1½” to 12’ deep, and up to 30’ in very clear water. Prefer lakes, ponds and slow-moving rivers and streams but can also grow in fast-moving water. Tolerates a wide range of water conditions, including spring water and even brackish water of tidal creeks and bays with salinity of up to 10 parts per thousand.

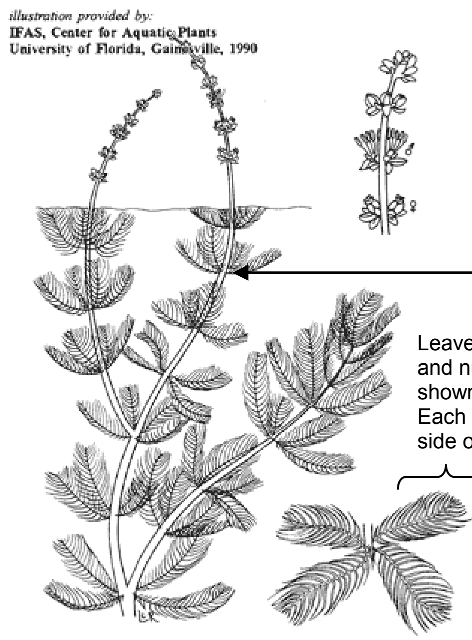
Substrate – Root in all types of substrates, and broken pieces float freely.

Known occurrences in California – Sacramento-San Joaquin Delta, San Francisco Bay Area and Central Valley ditches and lakes; margins of Southern California’s south-east border.

Key Features for Identification:

Finely divided, feather-like leaves ½ to 2“ long.

Color variation of Eurasian watermilfoil



Node: Each point where a leaf (or leaves) attaches to the stem.

Leaves less than 2” long, feathery and number 3-6, usually 4 (as shown here) around the stem. Each leaf has 14-24 leaflets per side of main rib.

Whorl: Circular arrangement of leaves (when viewed from above) around the stem. Usually number 3-6, usually 4 (as shown here).

BRAZILIAN WATERWEED OR BRAZILIAN ELODEA
Egeria densa

Species Description:

Plant – Green

Stems – Highly branched and can reach 25' or more in length.

Leaf attachment to stem (nodes) – Densely spaced at growing tip and indistinguishable. Points of attachment are more widely spaced near the main stem and stems deeper in the water. Double nodes bear branches and flowers.

Leaves – Thin, ¾ – 1½" in length and 1/16 – 1/8" wide, arranged circularly around the stems when viewed from above (whorls) of 3-6 leaves. Spear-shaped leaves have tiny teeth that may require a magnifying glass to see. The number of leaves doubles or triples (up to 12 leaves per whorl) every 8-12 whorls.

Flowers – Three white petals and are about ¾" across on 1" stems above the surface of the water.

Roots – Thin

Suitable Environmental Conditions:

Temperature – Survives in water between 40°F and 90°F.

Moisture – Underwater, in both flowing and shallow and standing water.

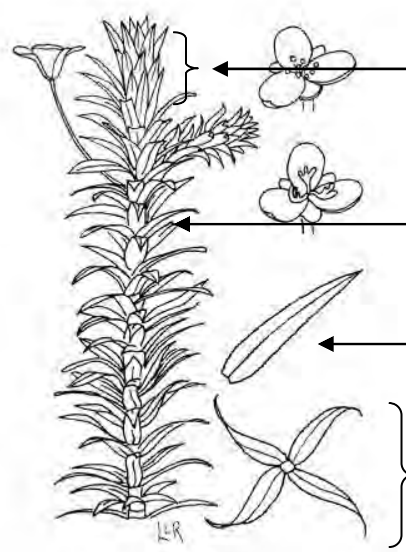
Substrate – Roots in all types of substrates; broken pieces float freely

.

Known occurrences in California – Throughout the Sacramento-San Joaquin Bay-Delta.

Key Features for Identification:

Robust 1-inch leaves closely spaced in whorls of 3-6 around the stem. Also refer to page 7 for a comparison with similar species.



Leaves densely spaced at growing tip

Node: Each point where a leaf (or leaves) attaches to the stem.

Leaves thin, ¾-1½" long and 1/16-1/8 wide in groups of 3-6 around the stem.

Whorl: Circular arrangement of leaves (when viewed from above) around the stem.

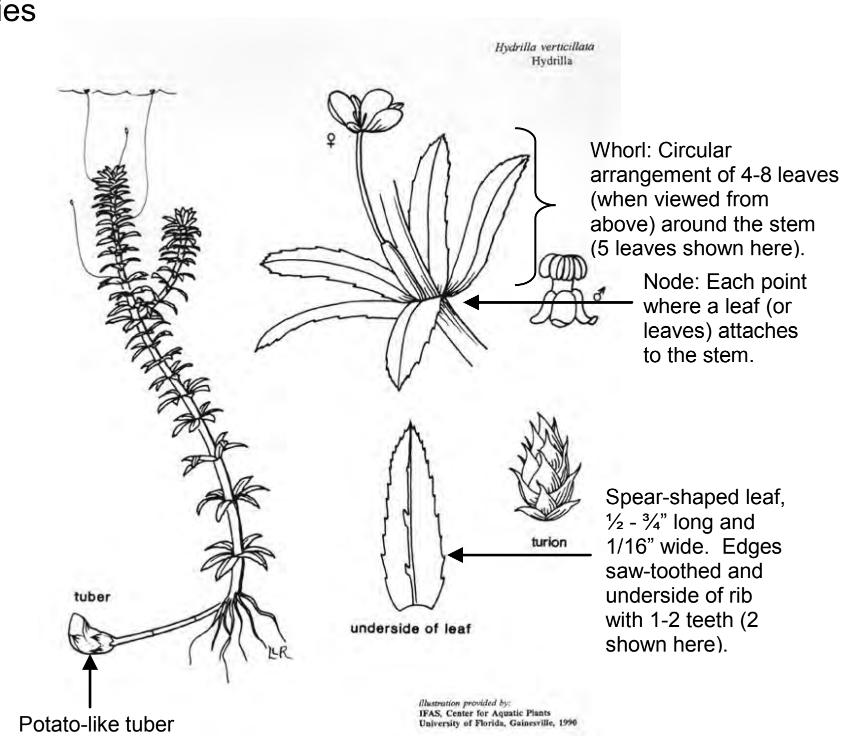
HYDRILLA
Hydrilla verticillata

Species Description:

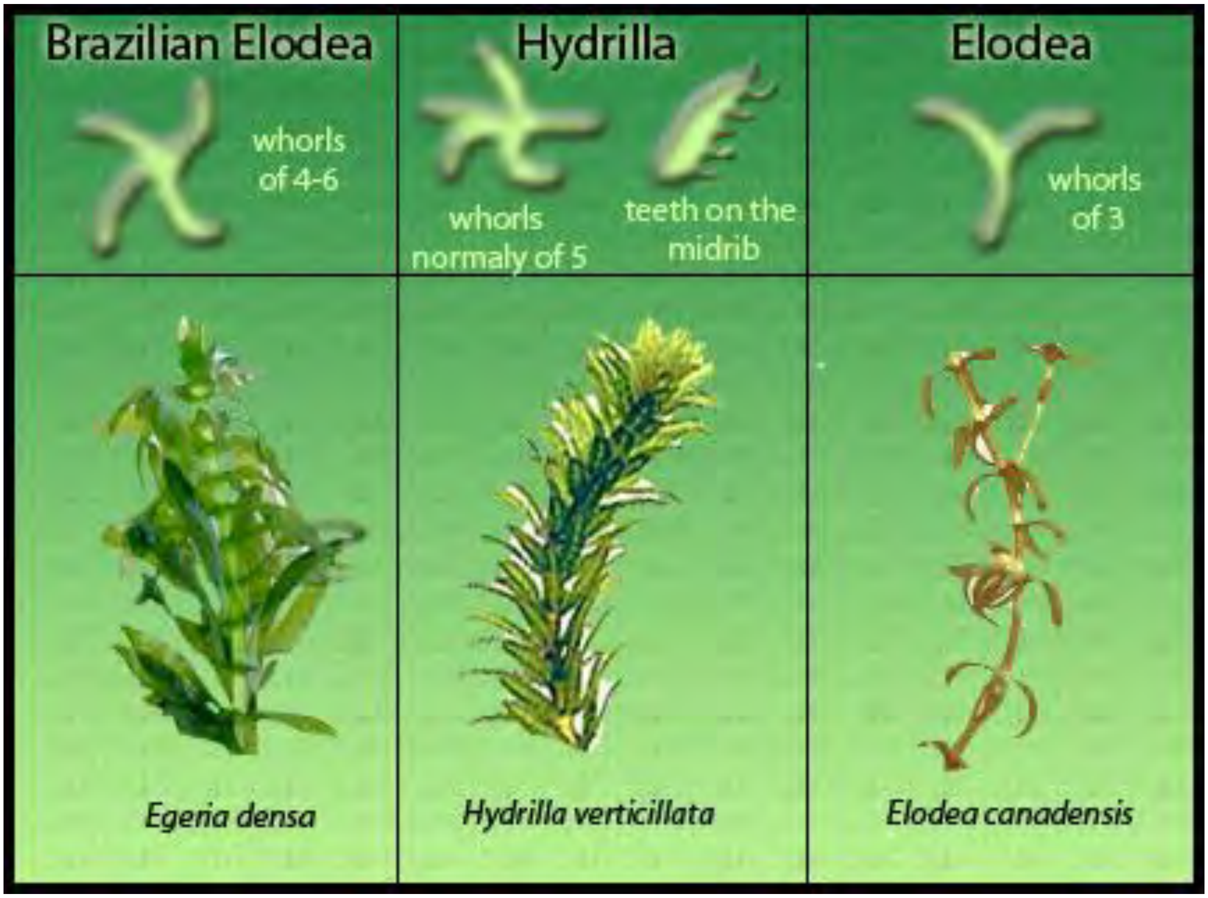
Plant – Green, up to 25’ long.
Stems – Slender, branched.
Leaves – Spear-shaped, ½ - ¾” long and 1/16” wide arranged in groups of 4-8 leaves around the stem. Leaf margins distinctly saw-toothed. Often 1-2 sharp teeth along the underside of the leaf rib.
Flowers – Tiny, white flowers born on long stalks at the surface of the water.
Roots – Roots are white and may have yellowish, potato-like structures ½” long and ½” wide at the tips of the roots.

Suitable Environmental Conditions:
Temperature – Somewhat winter-hardy; its optimum water temperature is 68^{o} F - 81^{o} F; its maximum temperature is 86^{o} F.
Moisture – Underwater, from a few inches deep to more than 20’.
Substrate – May be found in all types of water bodies including springs, lakes, ponds, marshes, ditches, canals, rivers, tidal zones. Broken pieces float freely.
Known occurrences in California – Sacramento-San Joaquin Delta.

Key Features for Identification:
Hydrilla has distinctly saw-toothed leaf edges and teeth on the leaf underside. In addition, potato-like tubers on roots are diagnostic. Also refer to page 7 for a comparison with similar species



Side-by-side comparison of two invasive aquatic plants, *Egeria densa* and *Hydrilla verticullata*, to that of the common native *Elodea canadensis*.



INVASIVE	**INVASIVE**	**NOT INVASIVE**

ROCK SNOT OR DIDYMO

Didymosphenia geminata

Rock out of water, colonized with rock snot.

Species Description:

Growth form – Single-celled algae that forms thick mats.
Size – Starts as small clumps and can spread to cover entire wetted areas.
Color – Pale yellowish-brown to white.

Suitable Environmental Conditions:

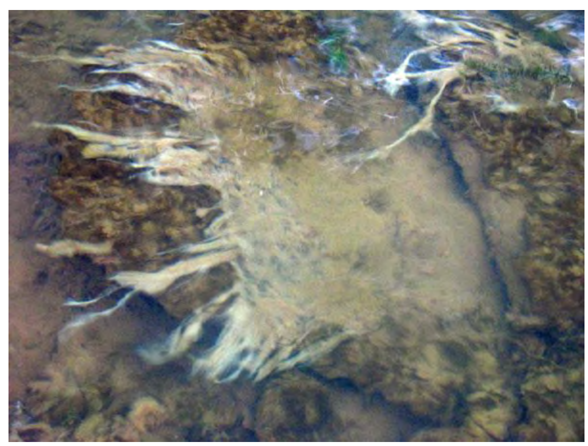
Temperature – 32° F - 72° F
Moisture – Under water.
Substrate – Attaches to hard and soft substrates at depths of 4” to 6½‘. Fragments float freely

Known occurrences in California – South Fork of the American River, Sierra Nevada.

Key Features for Identification:

Looks like slimy blobs attached to rocks or wet toilet paper trailing from rocks and aquatic plants in streams, and as mats in slow moving water. Appears slimy but feels coarse, like damp wool.

Rock snot structure, as seen under a microscope



Rock snot in flowing water

California Department of Fish and Wildlife
Aquatic Invasive Species Decontamination Protocol

California Department of Fish and Game
Aquatic Invasive Species Decontamination Protocol

The California Department of Fish and Game (DFG) is committed to protecting the state's diverse fish, wildlife, and plant resources, and the habitats upon which they depend. Preventing the spread of aquatic invasive species (AIS) in both DFG's activities, as well as those activities DFG permits others to conduct is important to achieving this goal. The protocols outlined below are a mandatory condition of your DFG authorization to work in aquatic habitats. They are intended to prevent the spread of AIS, including New Zealand mudsnail (*Potamopyrgus antipodarum*), quagga mussel (*Dreissena rostriformis bugensis*) and zebra mussel (*Dreissena polymorpha*). Information about New Zealand mudsnails and quagga and zebra mussels is summarized in Attachments A and B. For complete information on the threats of AIS and aids to their identification, please visit the Department's Invasive Species Program webpage at www.dfg.ca.gov/invasives or call (866) 440-9530.

Many AIS are difficult, if not impossible to see in the environment and can be unknowingly transported to new locations on equipment. Therefore, decontamination is necessary to prevent the spread of AIS between collection locations. Equipment shall be decontaminated between each use in different waterbodies. All equipment, including but not limited to, wading equipment, dive equipment, sampling equipment (e.g., water quality probes, nets, substrate samples, etc.), and watercraft, must be decontaminated using one or more of the protocols listed below. As an alternative to decontaminating on-site, you may wish to have separate equipment for each site and to decontaminate it all at the end of the day. Listed below are three options for equipment decontamination. Use your judgment and field sampling needs to select the method(s) that are appropriate for your equipment and schedule. **Because there are currently no molluscicides registered with the California Department of Pesticide Regulation that have been demonstrated to be effective for these three species, DFG cannot recommend chemical decontamination.** If you would like training on implementing these protocols please contact the Invasive Species Hotline at (866) 440-9530 or e-mail invasives@dfg.ca.gov

General field procedures to prevent the spread of AIS:

- If decontamination is not done on site, transport contaminated equipment in sealed plastic bags and keep separate from clean gear.
- When practical, in flowing water begin work upstream and work downstream. This avoids transporting AIS to non-infested upstream areas.
- For locations know to be infested with AIS, use dedicated equipment that is only used in infested waters. Store this equipment separately.

Equipment Decontamination Methods

Option 1: Dry

- Scrub gear with a stiff-bristled brush to remove all organisms. Thoroughly brush small crevices such as boot laces, seams, net corners, etc.
- Allow equipment to thoroughly dry (i.e., until there is complete absence of moisture), preferably in the sun. Keep dry for a minimum of 48 hours to ensure any organisms are desiccated.

Option 2: Hot water soak

- Scrub gear with a stiff-bristled brush to remove all organisms. Thoroughly brush small crevices such as boot laces, seams, net corners, etc.
- Immerse equipment in 140° F or hotter water. If necessary, weigh it down to ensure it remains immersed.
- Soak in 140° F or hotter water for a minimum of five minutes.

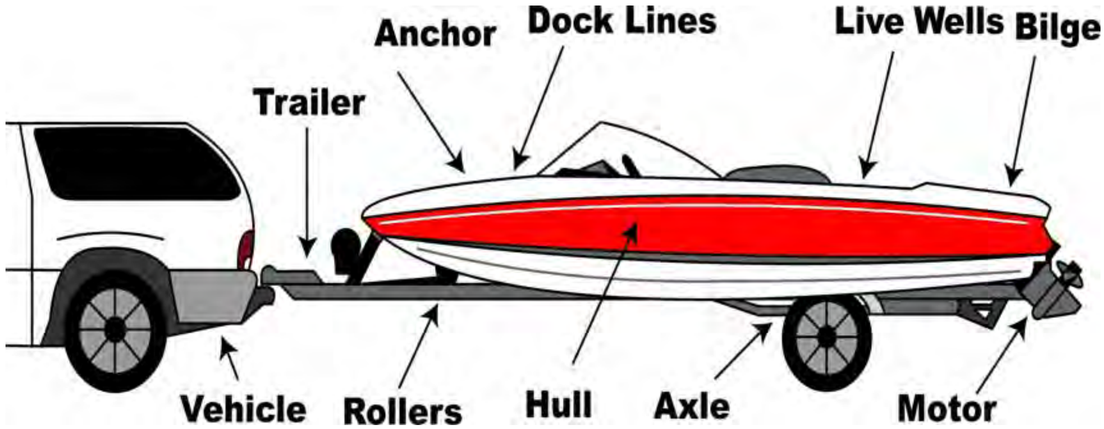
Option 3: Freeze

- Scrub gear with a stiff-bristled brush to remove all organisms. Thoroughly brush small crevices such as boot laces, seams, net corners, etc.
- Place in a freezer 32°F or colder for a minimum of eight hours.

Watercraft Decontamination

- Prior to leaving the launch area, remove all plants and mud from your watercraft, trailer, and equipment. Dispose of all material in the trash.
- Prior to leaving the launch area drain all water from your watercraft and dry all areas, including motor, motor cooling system, live wells, bilges, and lower end unit.
- Upon return to base facilities, pressure wash the watercraft and trailer with 140° F water*, including all of the boat equipment (i.e. ropes, anchors, etc.) that came into contact with the water.
- Flush the engine with 140° F water for at least 10 minutes and run 140° F water through the live wells, bilges, and all other areas that could contain water.

*To ensure 100% mortality the water needs to be 140° F at the point of contact or 155° F at the nozzle.



Reporting Aquatic Invasive Species

If you suspect you have found New Zealand mudsnail, quagga and zebra mussels, or other AIS, please immediately notify the DFG Invasive Species Program at (866) 440-9530 or e-mail invasives@dfg.ca.gov. Please provide your contact information, specific location of discovery, and digital photographs of the organisms (if possible).

Attachment A

New Zealand Mudsnail

The threat posed by New Zealand mudsnails (NZMS):

- NZMS reproduce asexually therefore it only takes a single NZMS to colonize a new location.
- NZMS are prolific, and a single NZMS can give rise to 40 million snails in one year.
- Densities of over 750,000 NZMS per square meter have been documented.
- NZMS out-compete and replace native invertebrates that are the preferred foods of many fish species and alter the food web of streams and lakes.

Identifying NZMS:

- NZMS average 1/8 inch in length, but young snails may be as small as a grain of sand. Adults bear live young.
- See the photos, below, for assistance identifying NZMS. Expert identification will be necessary to confirm identification.

NZMS Habitat:

- NZMS can live in most aquatic habitats, including silted river bottoms, clear mountain streams, reservoirs, lakes and estuaries.
- NZMS have a temperature tolerance of 32-77° F.
- NZMS can survive out of water for more than 25 days in cool, moist environments, and have been found over 40 feet from water.

Current known locations of NZMS in California can be found at http://nas.er.usgs.gov/taxgroup/mollusks/newzealandmudsnaildistribution.aspx

Attachment B

Quagga and Zebra Mussels

The threat posed by quagga and zebra mussels (Dreissenid mussels):

- Dreissenid mussels multiply quickly and out-compete other species for food and space.
- Their presence can alter food webs and alter environments, negatively affecting native and game fish species.
- Dreissenid mussels attach to hard and soft surfaces, and negatively impact water delivery systems, hydroelectric facilities, agriculture, recreational boating and fishing.
- Adults can survive up to 30 days out of water in cool, humid conditions.
- Produce microscopic larvae that can be unknowingly transported in water, including live-wells, bilges, and motors.

Identifying Dreissenid mussels:

- Typically the same size as a fingernail but can grow up to about 2 inches long.
- Variable, usually dark and light alternating stripes. May also be solid cream, brown, or black.

Dreissenid mussel habitat:

- Variable, including both hard and soft surfaces in freshwater.
- From surface depth to more than 400 feet in depth.

Current known locations of Dreissenid mussels in California can be found
http://nas.er.usgs.gov/taxgroup/mollusks/zebramussel/maps/CaliforniaDreissenaMap.jpg

Appendix H
ARCHAEOLOGICAL INVENTORY REPORT FOR THE DELTA RESEARCH STATION

This appendix contains the archaeological inventory report prepared for the Proposed Project. The archeological survey consisted of a literature review to identify any previously recorded archaeological sites that could be affected by the DRS, and a field survey to locate recorded sites and any other sites that may exist but have not yet been recorded.

T E C H N I C A L R E P O R T — F I N A L

ARCHAEOLOGICAL INVENTORY REPORT

DELTA RESEARCH STATION PROJECT

SOLANO AND SAN JOAQUIN COUNTIES, CALIFORNIA

July 2015

Prepared for:

Horizon Water and Environment, LLC
180 Grand Avenue, Suite 1405
Oakland, CA 94612
Michael Stevenson, MS
Principal

On behalf of:

California Department of General Services
California Department of Water Resources
U.S. Fish and Wildlife Service

Prepared by:

URS Corporation
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Sacramento, California 95833
Ben Elliott, MA, RPA
Senior Archaeologist

Limitations

This report contains confidential cultural resources location information; report distribution should be restricted to those with a need to know. Cultural resources are non-renewable, and their scientific, cultural and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities that can damage cultural resources, the locations of cultural resources should be kept confidential. The legal authority to restrict cultural resources information is in California Government Code 6254.1 and the National Historic Preservation Act of 1966, as amended, Section 304.

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List of Acronyms

APE	Area of Potential Effects
BP	Before Present
CCIC	Central California Information Center
CCTS	Central California Taxonomic System
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CHRIS	California Historical Resources Information System
Delta	Sacramento-San Joaquin River Delta
DGS	California Department of General Services
DRS	Delta Research Station
DWR	California Department of Water Resources
ERS	Estuarine Research Station
FTC	Fish Technology Center
IEP	Interagency Ecological Program
NAHC	Native American Heritage Commission
NHPA	National Historic Preservation Act
NWIC	Northwest Information Center
RPA	Registered Professional Archaeologist
URS	URS Corporation
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	United State Geological Survey

Executive Summary

The California Department of Water Resources (DWR) and United States Fish and Wildlife Service (USFWS), with assistance from the California Department of General Services (DGS), have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS or proposed project). The DRS will include an Estuarine Research Station (ERS) and Fish Technology Center (FTC). This document reports the findings of an archaeological investigation for the ERS/FTC elements of the DRS. URS Corporation (URS) was retained by Horizon Water and Environment, LLC to complete this archaeological survey in support of the proposed project.

The project team has selected two potential sites for the DRS: the Rio Vista Army Reserve Center site on Beach Drive in Rio Vista, California, and a site on Ryde Avenue in Stockton, California.

This report documents archaeological inventory methods and results as required for compliance with federal and California regulations. The archaeological survey consisted of a literature review to identify any previously recorded archaeological sites that could be affected by the proposed project, and a field survey to locate recorded sites and any other sites that may exist but have not yet been recorded. No archaeological resources were identified in the project's area of potential effect (APE) as a result of the assessment.

This report has been prepared based on certain key assumptions made by URS that substantially affect its conclusions and recommendations. These assumptions are that the information gathered during the record search is up to date and accurate, and that the field survey results accurately identified the presence or absence of archaeological resources visible on the ground surface. These assumptions, although thought to be reasonable and appropriate, may not prove to be true in the future. URS' conclusions and recommendations are conditioned upon these assumptions.

The archaeological inventory was performed based upon information obtained at the Central California and Northwest and San Joaquin Information Centers, and direct observation of site conditions and other information that is generally applicable as of September 2014. The conclusions and recommendations herein are therefore based on information available up to that point in time. Further information may come to light in the future that could substantially change the conclusions found herein.

Information obtained from these sources in this timeframe is assumed to be correct and complete. URS does not assume any liability for findings or lack of findings based upon misrepresentation of information presented to URS or for items that are not visible, made visible, accessible, or present at the time of the project area inventory.

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1 Introduction

1.1 Location and Setting

Two locations in the Sacramento-San Joaquin River Delta (Delta) region are currently under consideration for the siting of the proposed DRS (Figure 1). One of the potential locations is the former Army Reserve Training Center at Beach Drive in Rio Vista, Solano County. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle (Figure 2). The second potential location is a group of vacant parcels on the Deep Water Channel in Stockton, San Joaquin County. The Stockton location is accessed from Ryde Avenue. It is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle (Figure 3).

Rio Vista

The Army Reserve Center property, comprised of 28 acres, is on the west bank of the Sacramento River approximately 14 miles upstream of the Sacramento-San Joaquin River confluence. It is a low-lying area subject to tidal fluctuations and, prior to implementation of flood control and reclamation systems, it was a wetland. The property is depicted as within a wetland on the 1910 Rio Vista USGS 7.5' topographic map. At some point between 1910 and 1919 fill soils were imported and placed on the property to raise its elevation and make the land useable. Between 1919 and 1944 it was used by the U.S. Army Corps of Engineers (USACE) as the primary staging area for the construction of levees in the Delta as part of the Sacramento River Flood Control Project. Numerous buildings were constructed to support this effort. Aerial photography indicates continuous improvements were made on the property until 1970. Having gone through several incarnations as a military installation from the early 20th century into the 1990s before being purchased by the City of Rio Vista, the Rio Vista location is characterized by buildings and structures in various states of disrepair, roadways and paved surfaces, several docks along the river, supporting infrastructure, and unmaintained ornamental trees and vegetation. Historical architectural evaluations of the Army Reserve Center have been prepared by JRP (1997) and, most recently, Brunzell (2014) who prepared her evaluation in support of the current proposed project.

Stockton

This collection of parcels, which consists of 34.81 acres, is located along the Stockton Deep Water Channel. The Stockton Deep Water Channel is a modified slough, which was large enough in its natural state to have several branches that were also navigable "channels," but were filled in by the early 20th century as the city grew. Information from an Environmental Site Assessment screening for this project indicated that the parcels had experienced some limited development from 1957 to 1975 and, more recently were used as an occasional construction staging ground (URS 2014). The surface grade of the main parcel is several feet higher than the channel and surrounding area, suggesting a large amount of fill soil was imported to the site to raise it to its current elevation. The site is devoid of buildings and structures. The main parcel can be characterized as an open, vacant lot, much of which is covered in non-native, ruderal vegetation. Trees are present along the rip-rap lined bank of the Stockton Deep Water Channel; along the northwestern property boundary and northernmost parcel; and along the property boundary on West Fremont Street.

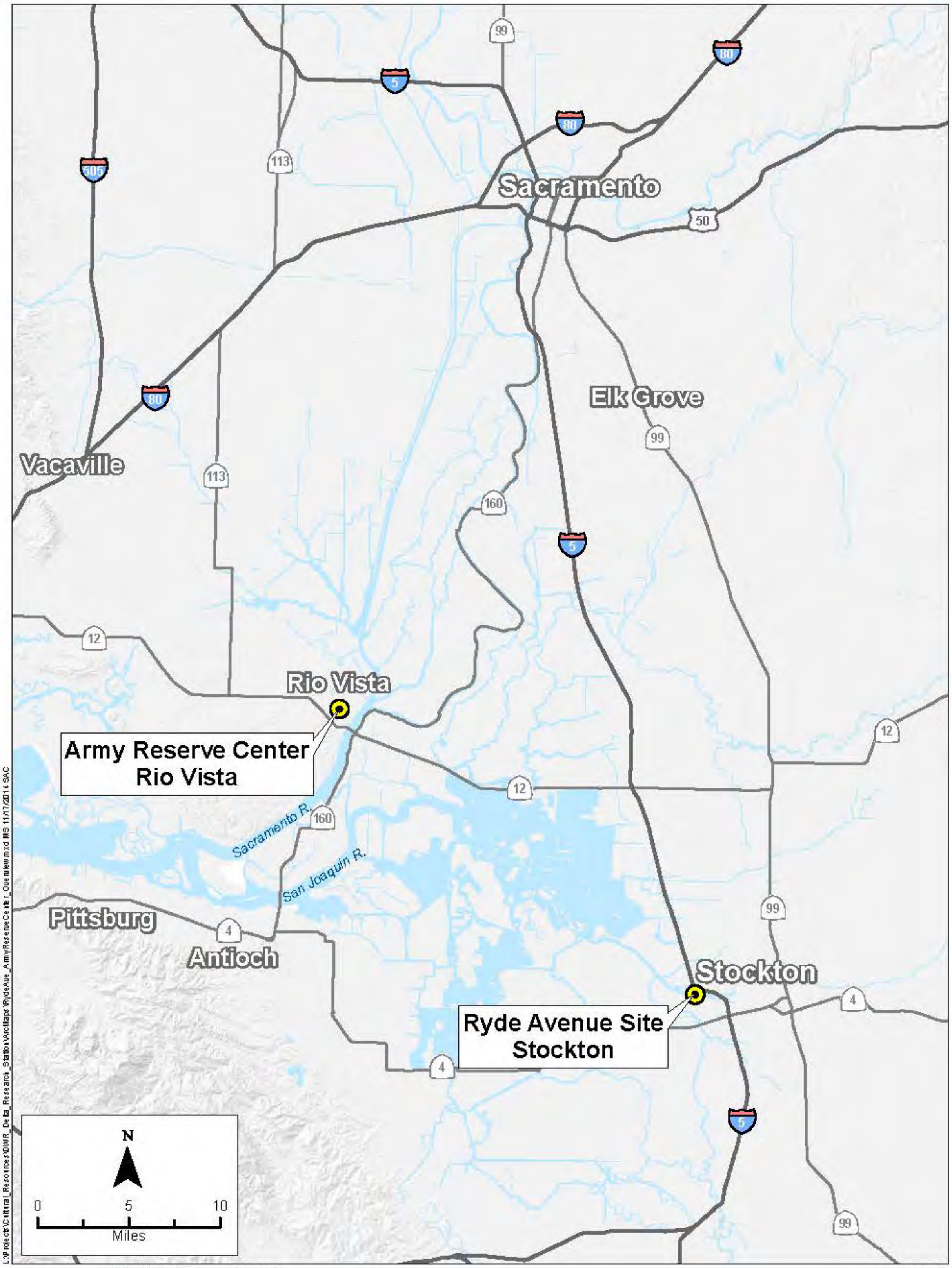
1.2 Project Description and Area of Potential Effects

The Delta Research Station (DRS) is a proposed science and research center in the Delta. The planned DRS would consist of two facilities, a proposed Estuarine Research Station (ERS) and Fish Technology Center (FTC). The DRS would provide improved and additional facilities for the Interagency Ecological Program (IEP), a collaborative program seeking to provide accurate and useful information to support adaptive management of the Delta and conservation of Delta ecosystems. The FTC would house refuge populations of special-status fishes such as Delta Smelt, and provide a location for management-oriented studies.

The specific objectives of each component of the DRS are as follows:

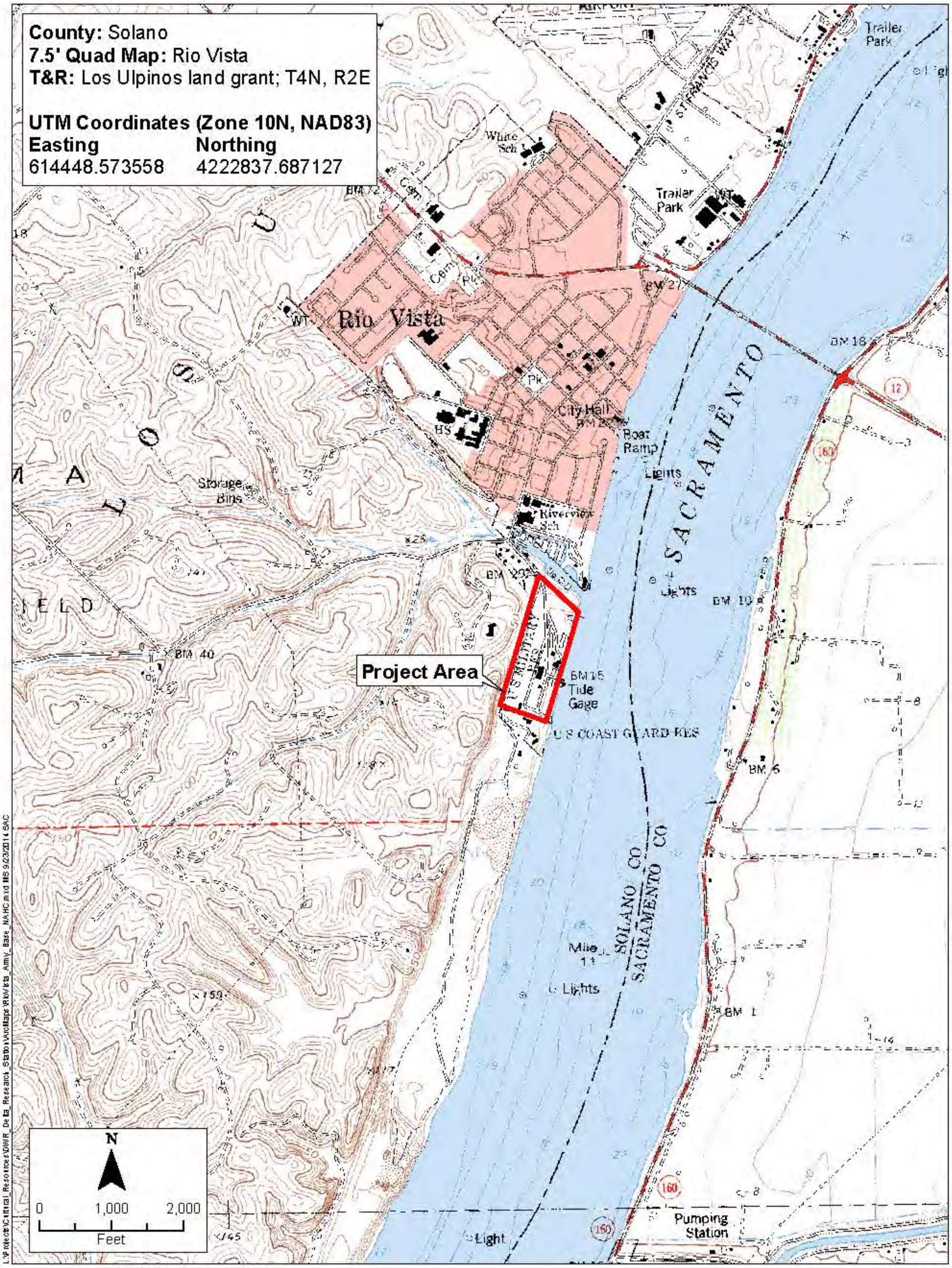
- ERS -
    1. Establish a research station in a central location within the Bay-Delta to facilitate ease of conducting monitoring and research;
    2. Co-locate the research station with a facility capable of studying fish in captivity (i.e., the FTC); and
    3. Provide facilities to conduct monitoring and research on the Bay-Delta's aquatic resources.
- FTC -
    1. Develop captive propagation technologies for the Bay-Delta's rare fish species;
    2. Test and refine the captive propagation techniques;
    3. Locate the facility where suitable water quality and quantity are available, and ability to discharge waste water given its various functions and operations is available; and
    4. Co-locate the FTC with a facility conducting conservation research on Bay-Delta rare fish species (i.e., the ERS)."

The archaeological area of potential effect (APE) is assumed to include the entirety of each parcel at both of the proposed project locations (see Figures 2 and 3). The Army Reserve Center APE consists of the 28 acres within assessor's parcel number 049-320-060. It is bounded by the Sacramento River on the east, a marina on the north, Beach Drive to the west, and a U.S. Coast Guard station to the south. The Ryde Avenue APE is made up of five parcels (assessor's parcel numbers 133-060-06, 133-090-07, 133-050-11, 133-100-02, and 133-100-05) that total 34.81 acres. This irregularly-shaped site is at the corner of Ryde Avenue and West Fremont Street. The Stockton Deep Water Channel lies to the south, the U.S. Navy Reserve Training Center is to the west, and a vacant field to the east.



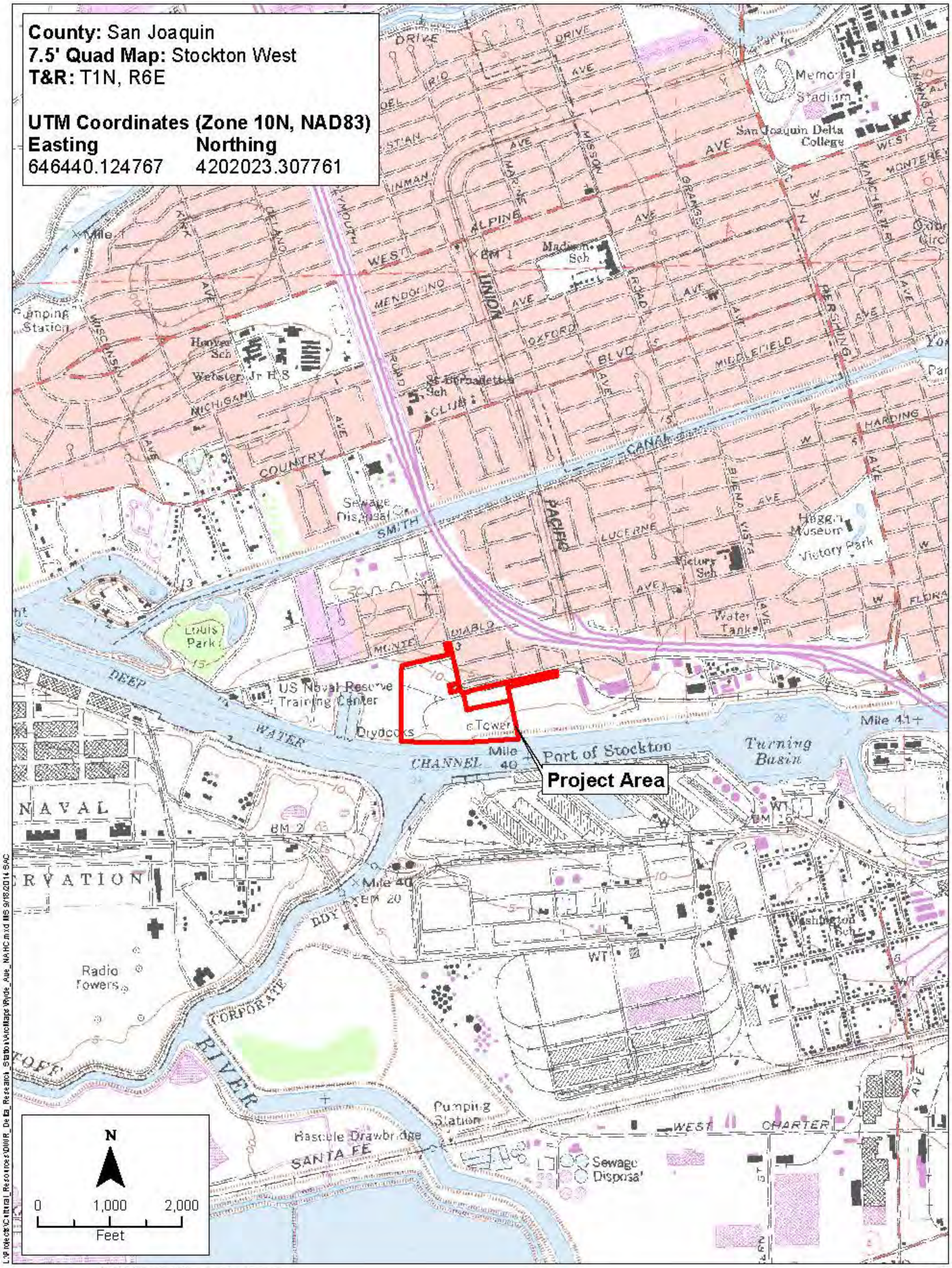
DWR Delta Research Station

Figure 1. Project Vicinity Map



URS DWR Delta Research Station
Rio Vista Army Base

Figure 2. Site Location Map
Proposed Delta Research Station Rio Vista Army Base



URS DWR Delta Research Station
845 Ryde Avenue

Figure 3. Site Location Map
Proposed Delta Research Station 845 Ryde Avenue

1.3 Regulatory Setting and Need for Study

1.3.1 State of California Regulations

The proposed project must comply with California Environmental Quality Act (CEQA) guidelines, which determine, in part, whether the project has a significant effect on a unique archaeological resource (per CEQA Section 21083.2) or a historical resource (per CEQA Section 21084.1).

CEQA Section 15064.5 notes that "a project with an effect that may cause a substantial adverse change in the significance of a historical resource is a project that may have a significant effect on the environment." Lead agencies are required to identify potentially feasible measures or alternatives to avoid or mitigate significant adverse changes in the significance of a historical resource before they approve such projects. According to the CEQA guidelines, historical resources are:

- Listed in, or determined to be eligible for listing in, the California Register of Historical Resources (per Public Resources Code 5024.1)
- Included in a local register of historical resources (per Public Resources Code 5020.1) or identified as significant in a historical resource survey meeting the requirements of CEQA Section 5024.1(k)
- Determined by a lead state agency to be historically significant

CEQA Section 15064.5 also applies to unique archaeological resources as defined in Public Resources Code 21084.1.

Section 5 of this report addresses California Register of Historical Resources eligibility criteria.

1.3.2 Federal Regulations

Development of the proposed project by USFWS constitutes a federal undertaking and mandates compliance with Section 106 of the National Historic Preservation Act (NHPA) of 1966. To comply with Section 106 of the NHPA, the project proponent must "take into account the effect of the undertaking on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register." The implementing regulations for the NHPA's Section 106 are found under Title 36 of the Code of Federal Regulations (CFR) Section 800, as amended in 2001. Section 5 of this report discusses eligibility criteria for listing cultural resources on the National Register of Historic Places. Cultural resources also may be considered separately under the National Environmental Protection Act per United States Code, Title 42, Sections 4321 through 4327. These sections require federal agencies to consider potential environmental impacts and appropriate mitigation measures for projects with federal involvement.

1.4 Personnel

Field work, analysis, and reporting were carried out by professionals who meet the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (Per Title 48 of the CFR, Section 44716, as amended in 1983). Procedures complied with NHPA Section 106 as set forth in Title 36 of the CFR, Section 800.

- Janis Offermann, Registered Professional Archaeologist (RPA), acted as Principal Investigator for the project. She has a bachelor's degree in anthropology from Sonoma State University in California and a master's degree in anthropology from the University of California at Davis. She has 38 years of experience in California archaeology and cultural resource management.
- Ben Elliott, RPA, authored this document, and directed research and field efforts for the assessment. He has a bachelor's degree in anthropology from University of California at Santa Cruz and a master's degree in cultural resources management from Sonoma State University in California. He has 13 years of experience in archaeology and cultural resource management in California and the Great Basin.
- Annamarie Leon Guerrero, RPA, assisted with field efforts. She has a bachelor's degree in anthropology from University of California at Berkeley and a master's degree in cultural resources management from Sonoma State University in California. She has 6 years of experience in archaeology and cultural resource management in California, Arizona, and Alaska.

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2 Project Context

2.1 Environmental Setting

Rio Vista

The Rio Vista property is fronted to the east by a tidally-influenced reach of the Sacramento River, approximately 14 miles upstream from its confluence with the San Joaquin River, where the Delta empties into the San Francisco Bay. The property is a low-lying area backed by the low, rolling Montezuma Hills immediately to the west. Historic maps depict the area as marshland, which suggests that, in prehistoric times, the property would have been continuously wet. Periodic flooding would certainly have been possible during winter months. The property would likely have supported an environment rich with floral and faunal resources for the indigenous population, including hydrophilic plants and a variety of waterfowl and aquatic habitat animals.

Stockton

Environmental conditions at the Stockton site were likely to have been similar to that of Rio Vista during the prehistoric era. The parcels are located on the Stockton Deep Water Channel, which is a natural slough that has been widened and deepened to accommodate large cargo vessels. The slough and the adjacent area, which may have included riparian habitat and grassland within the property, would have provided a research rich ecotone hosting a wide variety of aquatic and terrestrial plants and animals. Waterways such as the Deep Water Channel were often surrounded by “natural levees” that were gradually formed by overbank deposition. These natural levees provided a higher elevation surface, close to desirable resources, and suitable for habitation by the indigenous population.

2.2 Geomorphic Setting and Buried Archeological Potential

Because archaeological sites may be buried with no surface manifestation, precluding their observation during pedestrian survey, the potential for buried archaeological resources to be present in the project area must be assessed. The probability that a buried archaeological resource will be present in a project area is governed by several factors. These factors include:

- The presence of a buried stable land surface, called a paleosol;
- The paleosol’s age;
- The relative availability of a subsistence base required for human sustenance near the buried paleosol; and
- The presence or absence of known archaeological resources in the area.

These types of assessments are commonly referred to as “geoarchaeological studies.” A geoarchaeological assessment of the project’s potential APE is below.

Rio Vista

The United States Department of Agriculture (USDA) Web Soil Survey shows Tujunga fine sands covering the majority of the project area. The soil survey describes the sands on-site as being at least 80 inches deep and states they are associated with floodplains (USDA 2014). These data apparently contradict the depiction of the area as marshland on the 1910 Rio Vista USGS 7.5' topographic map. Some soil development would be expected for marshlands to be present. The area was likely given the marshland designation simply because it is low lying and was often inundated.

The close proximity of the property to the river channel, its low elevation, the presence of sands, and absence of soil development suggests a low sensitivity for buried archaeological resources at this location. Furthermore, the likelihood that the property contained an abundance of plant resources is low, given the on-site soil type and frequent disturbance by high water events on the river. It is more likely that a beach was present at this location during the dry portion of the year and may have provided the indigenous population with an access point to the river, but it is not a likely location for long-term habitation.

Stockton

The USDA Web Soil Survey shows Yellowlark gravelly loam covering the majority of the project area. The soil survey does not mention fill soils within the project area though omissions such as this occur frequently as available soils data are collected on a regional scale. The on-site native soil type, Yellowlark gravelly loam, is associated with alluvial fan remnants (USDA 2014). Such fan remnants represent a stable land surface that may now be buried under fill soils observed on-site during the field effort. Unlike the Rio Vista location, this site would not have been subjected to high energy, erosional flood events as water in the waterbody which has become the Stockton Deep Water Channel would have experienced periods of alluvial deposition. Though the age of the on-site native soils is unknown, the historic environmental setting, geomorphology, presence of nearby prehistoric habitation sites, and land use history of the Stockton project area indicate there is significant potential for buried archaeological resources here.

2.3 Prehistoric Context

Rio Vista and Stockton

Excerpted from Ballard et al. (2008:10-11)

The Central Valley cultural sequence is primarily a product of work in the Sacramento–San Joaquin River valleys and Delta region, which have a long history of archaeological investigation. The prehistoric cultural sequence for the greater Central Valley and Delta region was initially proposed by Lillard and Purves (1936) based on excavation of several mound sites on the floodplain of the Cosumnes River. The temporal sequence was defined by the association of particular artifacts and burial patterns. The Delta sequence, consisting of Early, Transitional, Late, and Historic periods (Lillard et al. 1939), was later refined by other researchers (e.g., Beardsley 1954; Heizer 1949, 1964;

Ragir 1972) and became the basis of the Central California Taxonomic System (CCTS) (for a synthesis, see Moratto 1984:181–184).

The temporal and cultural synthesis of the CCTS proposed three horizons. The Early Horizon (ca. 6000 to 3500 before present [BP]) is characterized primarily on the basis of burials and their accouterments. Extended inhumations oriented to the west were accompanied by large amounts of artifacts. These artifacts included large-stemmed and leaf-shaped projectile points and bifaces; a variety of charmstones; *Haliotis* and *Olivella* shell beads; bone pins; short stone pipes; ochre; and, only occasional, milling equipment (Schulz 1981:51). These burials were primarily recovered from indurated sands (Piper sandy loam) of the Delta region.

The Middle Horizon dates from ca. 3500 to 1400 Before Present (BP). Unlike the Early Horizon, Middle and Late Horizon mounds can be accurately characterized as middens. Mammal, bird, and fish bones are abundant (Schulz 1981:53). Extended inhumations continued to be the common means of burial in the San Joaquin Valley, while completely flexed inhumations were the most common in the Sacramento Valley (Schulz 1981:54). The Middle Horizon is defined by a variety of burial patterns and orientations, large concave-base points, distinctive charmstones and shell beads, cobble mortars and possible wooden mortars, and a wide range of bone tools and baked clay artifacts, the latter possibly used as boiling stones in the rock-poor Delta. Large projectile points are more frequently made of obsidian than in earlier times (Schulz 1981:54).

The Late Horizon, which includes the historic contact period as the latest phase, is characterized by the burning of grave offerings, including basketry; various types of burial positions and cremations; Haliotis and Olivella shell beads; magnesite disk beads and cylinders; clamshell disk beads; schist and steatite pipes; shaped flat-bottomed mortars with cylindrical pestles; small obsidian side-notched or serrated arrow points; and arrowshaft straighteners.

While knowledge about the Early Horizon is based primarily on mortuary data limited to a few sites, the more extensive investigations of Middle and Late Horizon sites have greatly contributed to the picture of lifeways in the riverine and valley contexts. Subsistence pursuits were varied during the Middle Horizon and included hunting of mammals and avian species, fishing, and seed harvesting. An increased reliance on acorns as a staple food, evidenced by increased numbers of mortars and pestles, distinguishes the subsistence pattern of the Late Horizon

Results of radiocarbon dating have indicated that the concepts of Early and Middle Horizons are misleading as broad, sequential developments. Many of the traits typical of particular horizons are absent in various parts of the Central Valley (Moratto 1984:199). The CCTS was composed of discrete, sequential units, therefore obscuring gradual changes through time. Central Californian prehistory was too complex and dynamic to be represented by a monolithic scheme such as the CCTS. The CCTS was eventually replaced on the basis of new data and a taxonomic concept that features integration of the pattern, which has less temporal emphasis than the horizon concept and places more importance on real relationships in technologies, economic pursuits, exchange relationships, and mortuary practices.

An archaeological pattern “represents an adaptive mode shared in general outline by a number of analytically separable cultures over an appreciable period of time within an appreciable geographic space. A pattern is characterized by (a) similar technological skills and devices (specific cultural items); (b) similar economic modes (production, distribution, consumption), including especially participation in trade networks and practices surrounding wealth (often inferential); and (c) similar mortuary and ceremonial practices” (Fredrickson 1973:118).

Best known from archaeological manifestations in the Delta and nearby grasslands, Windmiller Pattern sites (ca. 3000 BC to 1000–500 BC) are also recognized in the Sacramento Valley north of Sacramento, the Sierra Nevada foothills, and the Coast Ranges. The artifact assemblage includes a variety of flaked and ground stone, baked clay, and shell items, implying a diverse subsistence base and exchange or trade relationships with distant areas. Most of the non-obsidian rock (e.g., quartz crystals, calcite, alabaster, and schist) for Windmiller Pattern artifacts are from Sierra Nevada sources (Moratto 1984: 206), while much of the obsidian used for chipped stone artifacts is from the western Great Basin and North Coast Range sources (Jackson 1974). The Windmiller burial pattern is unique in that virtually all of the interments are ventrally extended with the head oriented to the west. Artifacts associated with burials are common and imply social stratification, with males generally having higher status than females. It has been suggested that Windmiller people lived in small, highly mobile groups, and that some Windmiller groups occupied the Sierra Nevada foothills during the summer and the Sacramento Valley during the winter. A riverine-marshland orientation is generally recognized for the Windmiller Pattern (Moratto 1984:206, 552). Windmiller deposits in the Central Valley and Delta are typically situated on low, broad mounds, and some are known to underlie complex archaeological deposits (e.g., principal villages) dating to subsequent periods. Windmiller type assemblages have also been identified in cave settings in the Sierra foothills.

The Berkeley Pattern (ca. 1000–500 BC to AD 500) represents a gradual subsistence shift to increased reliance on acorns, fish, and birds. Stone bowl mortars and pestles are found in large quantities. Also developed were an extensive bone tool kit, unique knapping techniques, and distinctive shell beads and pendants. Burial practices also differed from Windmiller sites, with flexed burials in variable orientations. Large shell heaps have been the focus of study in the Delta and San Francisco Bay regions, and many of these sites show subsequent occupation during Augustine Pattern times (Moratto 1984:207–211).

The Augustine Pattern (ca. AD 500 to 1880) artifact assemblage implies an intensification of hunting, gathering, and fishing necessitated by an expanding population (Moratto 1984:211–214). Acorns, freshwater and anadromous fish, and waterfowl were primary subsistence foods. Mortuary practices show significant variability and include cremation. Trade networks became more regularized, with serrated obsidian points, black steatite pipes and beads, magnesite cylinders and beads, charmstones, clam shell disk beads, and other durable goods traded into the Central Valley from the North Coast Range.

2.4 Ethnohistoric Context

Rio Vista

Both sides of the Sacramento River, from approximately 5 miles south of its confluence with the American River, downstream to Rio Vista, were occupied by the Plains Miwok (Bennyhoff 1977: Maps 2 and 3). In addition to the Sacramento River, they also lived along the Cosumnes and Mokelumne rivers in the eastern portion of the Sacramento Valley and north Delta region. The eastern border was identified by the presence of the foothills of the Sierra Nevada, while the western boundary was less defined, as these lands either consisted of the extremely dry Montezuma Hills at the south end of their territory, and the marshes of the Yolo Basin further to the north. It is likely that the Plains Miwok shared both of these regions with the Patwin, their neighbors to the west (Bennyhoff 1977:146). The Plains Miwok were closely related to their neighbors in the foothills to the east, the Northern Miwok, and the Bay Miwok, who lived downstream on the Sacramento River and around Suisun Bay. The Valley Nisenan were their neighbors to the north, and the Northern Valley Yokuts resided to the south. The Plains Miwok and all of their neighbors spoke languages derived from the Penutian language stock (Shipley 1978:82)

The Anizumne tribelet of the Plains Miwok lived in the area of Rio Vista (Bennyhoff 1977:78-81). The ethnographic village associated with the tribelet, lies approximately 2 miles north of the Rio Vista Army Base along the west side of the Sacramento River, in the vicinity of the original historic-era town. According to Bennyhoff (1977:78), "The Anizumne represented a moderate sized tribelet which accepted missionization immediately." Records from Mission San Jose indicate that the population had been removed from their homeland and baptized by 1812. As a result, little is known of this tribelet. There is speculation that some of the neophytes escaped the mission life and returned to their ancestral home by 1846, where they were encountered by settlers on Bidwell's Los Ulpinos land grant that included most of the Ompin and Anizumne tribelet ancestral territories (Bennyhoff 1977:80).

In general, the Plains Miwok resembled other California Central Valley tribes in that they were resourceful hunters and gatherers who relied on the natural abundance of the land for subsistence. Acorns were the primary staple, which were supplemented by a wide variety of seeds, nut, roots, berries and greens. Tule elk and Pronghorn antelope that occupied the valley plains and delta were the primary large game for the Plains Miwok. Jackrabbits and cottontails were also taken, and game birds such as quail and waterfowl were also of significant importance. The Anizumne would also have had access to an abundance of fish resources in the Sacramento River and nearby delta. Of these, salmon were the most important, though sturgeon and lampreys were also prevalent (Levy 1978:403). Tribelet territories were communally available for hunting and acorn gathering, but seed tracks and fishing stations were individually held (Bennyhoff 1977:11).

Technology focused on the use of wood and textiles (Bennyhoff 1977:12). Because the valley plains lacked significant stone resources, mortars and bowls were made of wood, as were arrow shafts and sticks used to gather roots. Textiles, including mats, baskets, and cordage were essential in nearly all aspects of daily life, including hunting, fishing, and the gathering of acorns and seeds. Baskets were used for cooking, storage, and other utensils. Hunting was conducted with the bow and arrow. The arrow points were made from locally available stone, or imported materials such as obsidian (Bennyhoff 1977:12; Levy 1978:403-406).

The Plains Miwok included at least 28 tribelets, which were independent political units that shared a common language and culture (Bennyhoff 1977:15). Tribelet size is estimated to have ranged between 300 and 500 individuals (Levy 1978: 410). Each tribelet permanently occupied a large central village along a major water course, though smaller villages might also be maintained within the tribelet lands. Houses were semi-subterranean structures covered with tule mats or grass and occupied by extended families. Every village had a sweathouse, but only the central tribelet village contained an assembly house. These were constructed in much the same manner as the residential house Bennyhoff 1977:11-12; Levy 1978:408-409).

Each tribelet was led by a chief, an inherited position. The primary functions of the chief were as an advisor to the community and as a manager of natural resources, as well as settling disputes. The chief also controlled the external relationships of the tribelet (Levy 1978:411).

Stockton

Excerpted from Ballard et al. (2008:8-9)

Northern Valley Yokuts territory extends south from the confluence of the Calaveras and San Joaquin Rivers to the point where the San Joaquin River turns abruptly east, and encompasses the central San Joaquin Valley east from the Diablo Range to the Sierra Nevada. Linguistic research indicates that the Northern Valley Yokuts are relative newcomers to the central San Joaquin Valley. They were pushed north by the Numic-speaking Monache beginning about 500 years ago (Kroeber 1959). Approximately 50 linguistically identifiable tribes were known to exist under the umbrella of "Yokuts" (Kroeber 1976:474). The project area lies within the ethnographic territory of the Chulamni Tribe of the Northern Valley Yokuts (Wallace 1978). Their territory extended down the San Joaquin and Calaveras Rivers, possibly as far west as Mount Diablo (Kroeber 1976:486). The Yokuts population, prior to contact with Europeans, has been estimated as 300 to 400 people in each tribe, with a total of 15,000 to 20,000 people for the entire group (Kroeber 1976:488). Another estimate, based on available food resources, suggests that the population was as high as 31,400 (Baumhoff 1963:221 in Ballard et al. 2008). The Northern Valley Yokuts territory included riparian woodland, freshwater marsh, valley grassland, oak woodland, open river channels, lakes, and sloughs (Schulz 1981:8). Little ethnographic information exists for the Northern Valley Yokuts because of depopulation and displacement that resulted from the rapid spread of disease during the early nineteenth century and Euroamerican invasion of their territory for gold-mining in the early to mid–nineteenth century (Wallace 1978:462-471).

The Northern Valley Yokuts relied heavily on fishing in the rivers, sloughs, and streams throughout their territory in the central San Joaquin Valley. Salmon spawned during the fall in the San Joaquin River and its tributaries. Sturgeon was also an important food resource. Dragnets, stone sinkers, and antler-tipped harpoons were used for fishing. Aquatic birds, such as duck and geese, and plant foods were an integral part of Northern Valley Yokuts subsistence. The Yokuts commonly used fire to encourage the growth of seed-bearing grasses and plants. Technology included seed processing implements such as the mortar and pestle, hand and milling stones, and wood mortars. Baskets were used in seed winnowing and acorn storage. The bow and arrow were the primary means for hunting mammals such as tule deer and pronghorn. Arrow points were made of local chert, jasper, and chalcedony. Obsidian was rare and only available through trade. In terms of volume, acorns were the single most important food in native Central California. During the winter months, when hunting and fishing could be difficult and fresh plant foods were unavailable, consumption of acorn products may have often exceeded that of all other foods combined (Schulz 1981:46 in Ballard et al. 2008).

Most Yokuts houses were circular or oval semi-subterranean single-family dwellings of tule mats over pole frames. Large communal residences sheltering 10 or more families were also constructed (Moratto 1984:174). Sweathouses and larger ceremonial chambers are documented in ethnographies. Settlements were reported on mounds above permanent waterways, likely because these elevated ground surfaces were safe from flooding and contained abundant food sources.

Trade was focused along the San Joaquin River corridor with native Californians who lived to the north and south of the Yokuts territory. Tule rafts were used for transportation as well as trade. Baskets, blankets, and arrows were traded from the Miwok in exchange for dogs (Barrett and Gifford 1933:270). Abalone and mussel shells were imported from the coast. Obsidian was most commonly acquired from sources on the eastern slope of the Sierra Nevada.

2.5 Historic-Era Context

The Delta region was first visited in historic times by Spanish explorers, including Pedro Fages and Juan Bautista de Anza, in the 1770s though no attempt at permanent settlement was made. Early Euroamerican settlement of the Rio Vista began in 1844 when the Mexican government granted John Bidwell the 17,726-acre Rancho Los Ulpinos, located along the Sacramento River. The rancho took its name from the Julpun, a sub-tribe of Miwok Indians who occupied the western banks of the Sacramento River. The first Euroamerican settlement of present day Stockton was made by Charles Weber who moved a group of trappers from nearby French Camp to Stockton in summer 1847.

The development of the contemporary City of Rio Vista began in 1862 after a flood caused major damage to the City's precursor known as the "Brazos del Rio" located approximately 2 miles northeast (Kyle et al. 2002: 349-350) of the present town. Agriculture and shipping played a significant part in the city's development, but the Army Reserve Center, which began as a base of operations for the USACE Sacramento River Flood Control Project, was also an economic anchor until its closure in 1992 (JRP 1997).

Stockton grew rapidly during the California Gold Rush as the provisioning center of the southern Sierra gold mines. Travel from San Francisco to Stockton was made by maritime vessels with the first steamer arriving in 1849 (Kyle et al. 2002: 349-350). As gold rush activity waned, agriculture, manufacturing and shipping industries continued to sustain growth of the city. The project area is located on the Deep Water Channel opposite the Port of Stockton in an area of mixed residential and industrial use. In contrast to the south bank of the channel, the project area has seen less development. Dry docks at the adjacent parcel and a rail spur leading to the subject property depicted on the USGS 15' 'Stockton' 1952 topographic map suggests some type of industrial facility was located here in the mid-20th century thought the property is currently vacant.

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3 Inventory Methods

In accordance with the Secretary of the Interior's Standards and the Guidelines for Archaeology and Historic Preservation (Title 48 of the CFR, Section 44716 [amended 1983]), the goals of this archaeological inventory were to identify and completely document the location, qualities, and condition of any potential historic properties in the project's APE. Methods employed to achieve these goals follow.

3.1 Native American Consultation

URS sent an email on September 18, 2014 to the Native American Heritage Commission (NAHC) requesting a review of NAHC Sacred Lands File for known areas of concern within the project APE. A mailed response was received October 6, 2014, stating a review of the Sacred Lands File was conducted. According the NAHC, no sacred lands are on file within the APE. The NAHC provided a list of 17 Native American individuals and organizations that might have information pertinent to this project or concerns regarding proposed project activities. Copies of this correspondence are in Appendix A.

Letters and a map were sent on November 19, 2014 to the contacts listed by the NAHC in their October 6, 2014 correspondence. The letters were intended to inform the individuals and organizations about the project, to inquire whether they knew of any unrecorded Native American cultural resources or other areas of concern within or adjacent to the study area, and to solicit comments, questions, or concerns with regard to the project. A project location map was included with each letter (Appendix A). Letters were sent to the contacts shown in Table 1. Follow-up telephone calls were made to each contact on December 5, 2014.

The DWR also faxed a request to the NAHC for a search of the Sacred Lands File on December 10, 2014. The NAHC confirmed, in a letter dated December 10, 2014, that their records showed that there are no sacred lands on file in the projects areas. The list of Native American individuals and organizations that might have information pertinent to this project provided by the NAHC included four individuals that were not previously identified. Letters to those four contacts were sent by URS on December 18, 2014 (Appendix A).

Table 1. Native American Consultation

Organization/ Tribe	Name of Contact	Letter Date	Telephone Follow-up Date	Comments
Ohlone/Costanoan, Northern Valley Yokut, Bay Miwok	Ms. Katherine Erolinda Perez	19 November, 2014	5 December, 2014	A voice message was left on answering service.
Miwok	Mr. Randy Yonemura	19 November, 2014	5 December, 2014	A voice message was left on answering service.
Buena Vista Rancheria	Chairperson Rhonda Morningstar Pope	19 November, 2014	5 December, 2014	A message was left with office staff.
Calaveras Band of Mi-Wuk Indians	Chairperson Gloria Grimes	19 November, 2014	5 December, 2014	A voice message was left on answering service.
Calaveras Band of Mi-Wuk Indians	Ms. Debra Grimes	19 November, 2014	5 December, 2014	The primary number for this person is currently out of service. The secondary number is the same for the previous individual, Gloria Grimes.
Calaveras Band of Mi-Wuk Indians	Mr. Adam Lewis	19 November, 2014	5 December, 2014	A voice message was left on answering machine (same number as Gloria Grimes).
California Valley Miwok Tribe	Chairperson Silvia Burley	19 November, 2014	5 December, 2014	Spoke to office staff and was asked to phone back after 2pm. Spoke to Chairperson Burley 12/8/14. The tribe has no issue with the project and will respond in writing at a later date.
Ione Band of Miwok Indians	Chairperson Yvonne Miller	19 November, 2014	5 December, 2014	Spoke to office staff and referred to Anthony Burris for whom a message was left.
Ione Band of Miwok Indians Cultural Committee	Chairperson Anthony Burris	19 November, 2014	5 December, 2014	A message was left with office staff.
Wilton Rancheria	Chairperson Raymond Hitchcock	19 November, 2014	5 December, 2014	A voice message was left on answering service.
Wilton Rancheria	Mr. Steven Hutchason	19 November, 2014	5 December, 2014	A voice message was left on answering service at the same number as the individual listed above, Chairperson Hitchcock
Wintun / Patwin	Mr. Kesner Flores	19 November, 2014	5 December, 2014	A voice message was left on answering service.
Cortina Band of Indians	Chairperson Charlie Wright	19 November, 2014	5 December, 2014	A voice message was left on answering service.
Yocha Dehe Wintun Nation	Chairperson Marshall McKay	19 November, 2014	5 December, 2014	A message was left on answering service of Mr. McKay's assistant.

Table 1. Native American Consultation

Organization/ Tribe	Name of Contact	Letter Date	Telephone Follow-up Date	Comments
Yocha Dehe Wintun Nation	Mr. Leland Kinter	19 November, 2014	5 December, 2014	A message was left on answering service for cultural resources staff. Marilyn Delgado retuned call and left a voice message stating James Sarmento, cultural resources manager would be in touch.
Yocha Dehe Wintun Nation	Ms. Cynthia Clarke	19 November, 2014	5 December, 2014	A message was left on answering service for cultural resources staff. Marilyn Delgado retuned call and left a voice message stating James Sarmento, cultural resources manager would be in touch.
Ione Band of Miwok Indians	Ms. Pamela Baumgartner	18 December, 2014	23 February, 2015	Ms. Baumgartner is no longer employed by the tribe as Tribal Administrator. Talked with Sharol McDade, the new Tribal Administer. A copy of the original letter was emailed to her on the same day as the follow-up phone call. Ms. McDade replied that she forwarded the letter to Andrew Ramey and Kyle Dutchke for review.
Ione Band of Miwok Indians	Ms. Tina Reynolds	18 December, 2014	24 February, 2015	Ms. Reynolds deferred response to Andrew Ramey, Kyle Dutchke, and Randy Yonemura.
Southern Sierra Miwuk Nation	Chairperson Lois Martin	18 December, 2014	24 February, 2015	Chairperson Martin noted that the project location was outside of her knowledge area but would like to be informed of any discoveries on the Stockton site.
Southern Sierra Miwuk Nation	Mr. Les James	18 December, 2014	24 February, 2015	A voice message was left on answering service.

Chairman Anthony Burris responded to the follow-up telephone call on Dec. 9, 2014, stating that he had not received the original letter and requested a replacement. URS forwarded a copy of the letter to Chairman Burris on December 9, 2014 via email. Chairperson Lois Martin was reached during a follow-up phone call on February, 24, 2015. Chairperson Martin asked to be notified if anything was discovered during construction, but stated that the area was really beyond her tribe's area of knowledge.

Two letter responses were also received. Chairperson Silvia Burley of the California Valley Miwok Tribe responded on December 10, 2014, noting that her tribe has concerns about the Ryde Avenue location since it has a moderate potential for buried resources. Chairperson Burley also requested that her tribe be notified if any artifacts or human remains are discovered at the Stockton site during construction.

Chairman Marshall McKay, of the Yocha Dehe Wintun Nation, responded in a letter dated December 15, 2014. Chairman McKay noted that the tribe has no knowledge of cultural resources near the Rio Vista location, however he asked for information about the date of construction for the project and mitigation measures. Per the directions of Chairman McKay's letter, URS responded to Mr. James Sarmento, Tribal Cultural Resources Manager. On December 19, 2014, an email was sent to Mr. Sarmento, which stated that project construction would be after the environmental documents were finalized in the summer of 2016, and that mitigation measures would presented in the draft environmental documents.

No other individuals or organizations have expressed concern or offered additional information regarding the project in all communication that has occurred to date. Additional communication will be added to the administrative record as it received and interested parties will be referred to the appropriate contact at the lead agency for the project, if requested.

3.2 Archival Research

Rio Vista

An archival records search of the Rio Vista site and a 0.25-mile buffer was conducted by staff of the Northwest Information Center (NWIC), an affiliate of the California Office of Historic Preservation's California Historical Resources Information System (CHRIS), on May 30, 2014. Materials generated by the record search conducted at the NWIC are in Appendix B.

Stockton

An archival records search of the Stockton site and a 0.25-mile buffer was conducted by staff of the Central California Information Center (CCIC), an affiliate of the California Office of Historic Preservation's CHRIS, on May 15, 2014. Materials generated by the record search conducted at the CCIC are in Appendix B.

3.3 Pedestrian Survey

Rio Vista

The entire property was subjected to an intensive pedestrian survey completed by URS archaeologists Ben Elliott, RPA, and Annamarie Guerrero, RPA, on September 16, 2014. Mr. Elliott and Ms. Guerrero surveyed the majority of the project area in 10-meter transect intervals. Densely vegetated areas along the property's shoreline were surveyed intuitively. During the pedestrian survey, the project area was inspected for the presence of cultural materials, including prehistoric and historic-era habitation debris, prehistoric features, and historic-era structural remains.

Stockton

The entire property was subjected to an intensive pedestrian survey completed by URS archaeologist Ben Elliott, RPA, on September 30, 2014. Mr. Elliott surveyed the entire project area in 10-meter transect intervals. During the pedestrian survey, the project area was inspected for the presence of archaeological cultural materials, including prehistoric and historic-era habitation debris (i.e., stone tools or tool manufacturing debris, glass fragments, tin cans), prehistoric features (i.e., fire hearths, house pits), and historic-era structural remains (i.e., house foundations, wells).

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4 Inventory Results

4.1 Archival Research

Archival research of the APE and a 0.25-mile radius was completed for the Rio Vista location at the NWIC on May 30, 2014. Research of the Stockton location was completed at the CCIC on May 15, 2014. Results are summarized below.

4.1.1 Previous Studies

Rio Vista

Three studies have been conducted within the Rio Vista site:

S-029351 JRP Historical Consulting Services. 1997. Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, California.

S-038635 Lydecker, Andrew D.W. 2010. Cultural Resources Remote Sensing and Diver Investigations at Selected Target Locations, Sacramento River Bank Protection (SRBPP), Sacramento River and Tributaries. Panamerican Consultants, Inc.

S-038637 Havelaar, Christian, Melissa Cascella, Patricia Ambacher, and Gabriel Roark. 2012. Historic Properties Treatment Plan, Sacramento River Bank Protection. ICF International.

One additional study has been conducted within a 0.25-mile radius of the property:

S-o11115 Bouey, Paul D. 1989. An Archaeological Survey of the Proposed Del Rio Hills Golf Course and Residential Development Adjacent to the City of Rio Vista. Far Western Anthropological Research Group, Inc.

Stockton

Two studies have been conducted within the Stockton site:

S-00766 Napton, L.K. 1981. Cultural Resource Reconnaissance of the EIR-801 Sohio Project, City of Stockton, San Joaquin County, California.

S-01542 Peak, A. 1975. Cultural Resource Assessment of the North Stockton Interceptor, San Joaquin County, California.

Ten additional studies have been conducted within a 0.25-mile radius of the property:

S-o2964 Basin Research Associates. 1996. Archaeological Sensitivity Review: NCS Stockton, San Joaquin County and NRFT Dixon, Solano County.

S-03246 National Park Service. 1997. Historic American Buildings Survey (HABS) Naval Supply Annex, Stockton (Naval Communication Station, Stockton) Rough and Ready Island, San Joaquin County, California, Volume I and II.

S-03646 Cardiff, D. 1999. Department of Transportation Negative Archaeological Survey Report, 10-SJ-5, 10-170, EZ 444800.

S-05583 Jensen, P. 2004. Archaeological Inventory Survey, Montecito Town Homes Development Project, c. 4 Acres Adjacent to Shimizu Drive at Kingsley, Stockton, San Joaquin County, California.

S-05945 Jensen, P.M. 2005. Archaeological Inventory Survey, Proposed Buena Vista Storm Drain Project, Adjacent to the Stockton Deep Water Channel, Stockton, San Joaquin County, California.

S-06076 Uribe & Associates. 1996. Archaeological Resources Protection Plan for the Naval Communication Station, Stockton, California.

S-06277 Busby, C. 2006. Archaeological Records Search Literature Review and Field Review in Support of an Initial Study for M&L Commodities, Inc., Inland North Cold Storage, East Complex, Port of Stockton, City of Stockton, San Joaquin County, California.

S-06701 Goetter, K 2008. Archaeological Survey Report for the Interstate 5 North Stockton Corridor Interchanges Improvements Project, San Joaquin County, California, 10-SJ-6, PM 25.2-38.8.

S-06717 Goetter, K 2008. Historic Property Survey Report for the Interstate 5 North Stockton Corridor Interchanges Improvements Project, San Joaquin County, California, 10-SJ-6, PM 25.2-38.8.

S-07539 Pappas, S., and L. Westwood. 2011. Cultural Resources Inventory Report, Stockton "A" Reconductoring Project, San Joaquin County, California; ECORP Project No. 2011-123.

4.1.2 Previously Recorded Resources

Rio Vista

Though not identified in the records search results provided by the NWIC, there is one previously recorded resource in the project APE, the U.S. Army Reserve Center. This resource has not been designated a CHRIS number. Five additional previously recorded resources were identified by the NWIC within 0.25 mile of the project APE:

- P-39-000916: "an old railway pier" (submerged) identified using remote sensing equipment
- P-39-000917: an unidentified "vessel in excess of 200 feet" identified using remote sensing equipment and confirmed during the diving phase of an investigation conducted by the USACE

- P-39-000938: "a wreck" (submerged) identified using remote sensing equipment
- P-39-000951: "a large section of wreckage" (submerged) identified using remote sensing equipment
- P-39-000953: "vessel related debris" (submerged) identified using remote sensing equipment

Stockton

There are no previously recorded resources identified in the project APE. One previously recorded resource was identified by the CCIC within 0.25 mile of the project APE:

- P-39-000490: Albert Lindley House (Quarters A, Residence of the Base Commander, Naval)

4.2 Pedestrian Survey

Rio Vista

The Rio Vista property has been significantly modified from its natural state over the course of its operational lifespan as a military installation. Very little native land surfaces remain intact within the APE, much of which is paved or graveled over. Dark, fine-grained sands were noted in the eastern portion of the subject parcel along Beach Drive. There was no conclusive evidence that the sands were undisturbed. Open portions of the parcel have been tilled in recent years.

No previously unrecorded prehistoric or historic-era resources were identified and recorded during the field effort. Various items related to the Army Reserve Center and its proceeding usage were noted during the survey. No historic-era items predating the Army Reserve Center complex were identified.

Stockton

The Stockton site is vacant land. Soils in the APE include non-native fill deposits overlying quaternary alluvium. Fill soils overlie the project APE at a minimum depth of 3 to 6 feet. The entire ground surface within the project APE is paved or graveled, with significant overgrowth by ruderal vegetation which greatly impaired ground surface visibility in the project area.

No archaeological resources were identified in the project APE during the intensive pedestrian survey conducted September 30, 2014.

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5 Summary and Recommendations

The project team, consisting of DGS, DWR, and USFWS, are considering two sites for the potential development of the DRS. The locations are Rio Vista Army Base on Beach Drive in Rio Vista, and a site on Ryde Avenue in Stockton, California. URS cultural resources personnel completed an archaeological inventory of these locations. No archaeological resources were identified as a result of the archaeological survey.

Although no archaeological resources were identified by the archaeological inventory, archaeological sites may be buried with no surface manifestation. If prehistoric or historic-era materials are encountered, all work in the vicinity shall halt until a qualified archaeologist can evaluate the discovery and make recommendations pursuant to 36 CFR § 800.13(b). Prehistoric materials will most likely include obsidian and chert flaked-stone tools (e.g., projectile points, knives, choppers), tool-making debris, or milling equipment, such as mortars and pestles. Historic materials might include remains of agricultural implements, stone or concrete footings and walls, and deposits of metal, glass, and/or ceramic refuse.

The possibility of encountering human remains cannot be discounted. Section 7050.5 of the California Health and Safety Code states that it is a misdemeanor to knowingly disturb a human burial. If human remains are encountered, work should halt in the vicinity of the remains and, as required by law, the Solano County or San Joaquin County coroner should be notified immediately. An archaeologist should also be contacted to evaluate the find. If human remains are of Native American origin, the Coroner must notify the NAHC within 24 hours of that determination. Pursuant to California Public Resources Code Section 5097.98, the NAHC, in turn, will immediately contact an individual who is most likely descended from the remains (i.e., the Most Likely Descendant). The Most Likely Descendant has 48 hours to inspect the site and recommend treatment of the remains. The landowner is obligated to work with the Most Likely Descendant in good faith to find a respectful resolution to the situation and entertain all reasonable options regarding the Most Likely Descendant's preferences for treatment.

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6 References

Ballard et al. 2008	Ballard, Hannah, Lisa Pesnichak, Kevin Bartoy, and John Holson. 2008. Archaeological Investigations at CA-SJO-312/H (P-39-004601), Stockton, San Joaquin County, California. Prepared for URS Corporation. Pacific Legacy, Inc., Berkeley, CA.
Bennyhoff 1977	Bennyhoff, J. A. 1977. Enthogeography of the Plains Miwok. Center for Archaeological Research at Davis, Publication Number 5, Davis, California.
Brunzell 2014	Brunzell, Kara. 2014. Historic Architectural Assessment for the Delta Research Station. Report in possession of URS.
JRP 1997	JRP. 1997. Evaluation of National Register Eligibility, Rio Vista Army Reserve Center. Rio Vista, Solano County, California. Prepared by JRP Historical Consulting Services. Davis, CA.
Kyle et al. 2002	Kyle, Douglas E., Hoover, Mildred, Hero Eugene Rensch, and Ethel Grace Rensch, 2002. Historic Spots in California. 5th edition, Stanford, CA: Stanford University Press.
Levy 1978	Levy, Richard. 1978. Eastern Miwok. In Handbook of North American Indians, Volume 8, California, R. F. Heizer (ed.): 398-412. Washington DC: Smithsonian Institute Press.
Shipley 1978	Shipley William, 1978. Native Languages of California. In Handbook of North American Indians, Volume 8, California, edited by Robert F. Heizer, pp. 80-91. Smithsonian Institution, Washington, D.C.
URS 2014	URS Corporation. 2014. Phase I Assessment, Ryde Avenue, Stockton, California 95203.
USDA 2014	United States Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey. Available online at: http://websoilsurvey. nrcs. usda. gov/app/HomePage. htm. Accessed November 14, 2014.

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Appendix A

Native American Correspondence

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Appendix B

CHRIS Information Center Results

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Appendix A

Native American Correspondence

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Additional Information

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Delta Research Station

County Solano

USGS Quadrangle

Name Rio Vista - 2 locations

Township ____ Range ____ Section(s) Los Ulpinos Land Grant

Company/Firm/Agency:
URS

Contact Person: Janis Offermann

Street Address: 2870 Gateway Oaks Drive, Suite 150

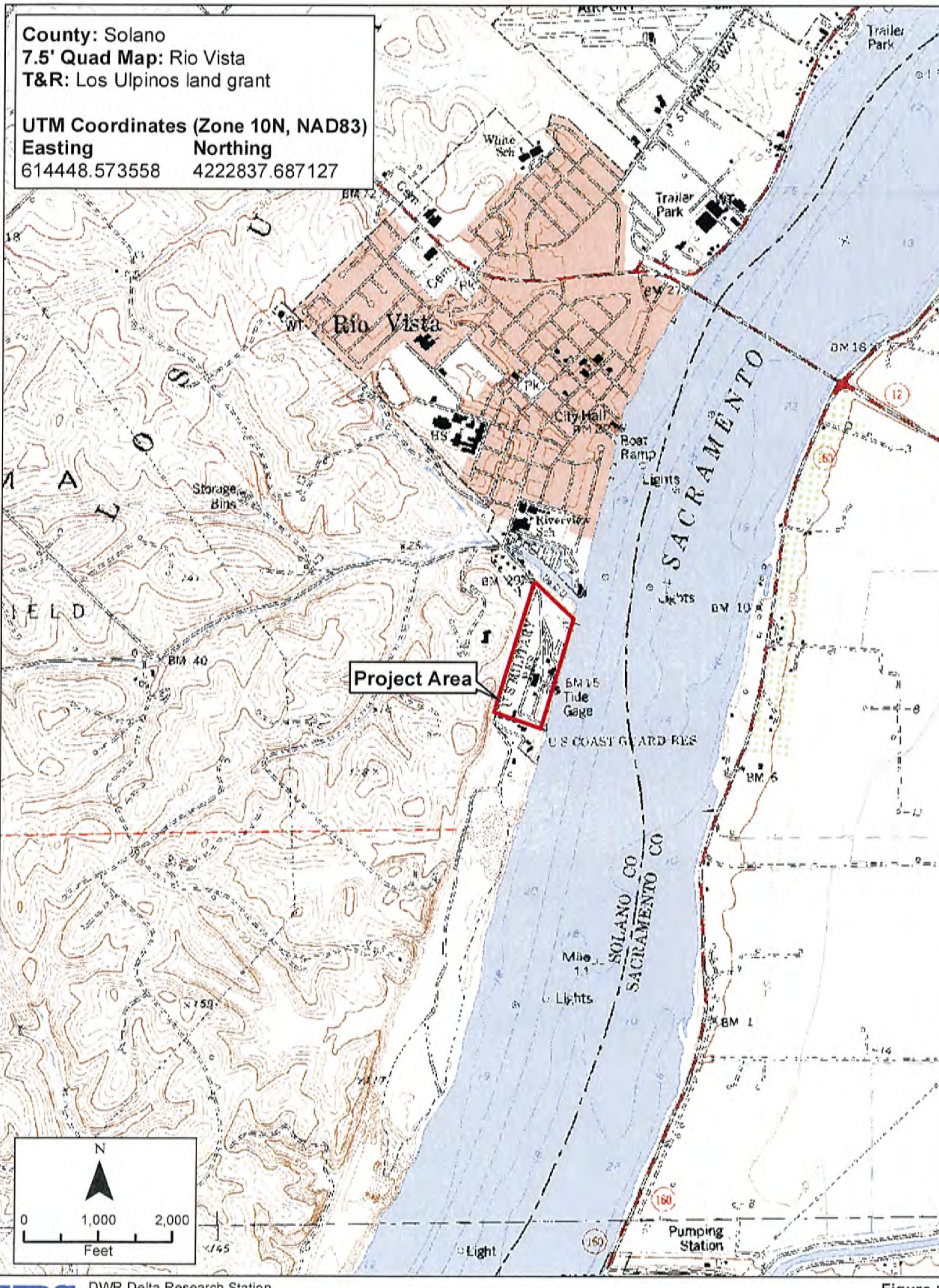
City: Sacramento Zip: 95833

Phone: (916) 679-2020

Fax: (916) 679-2000

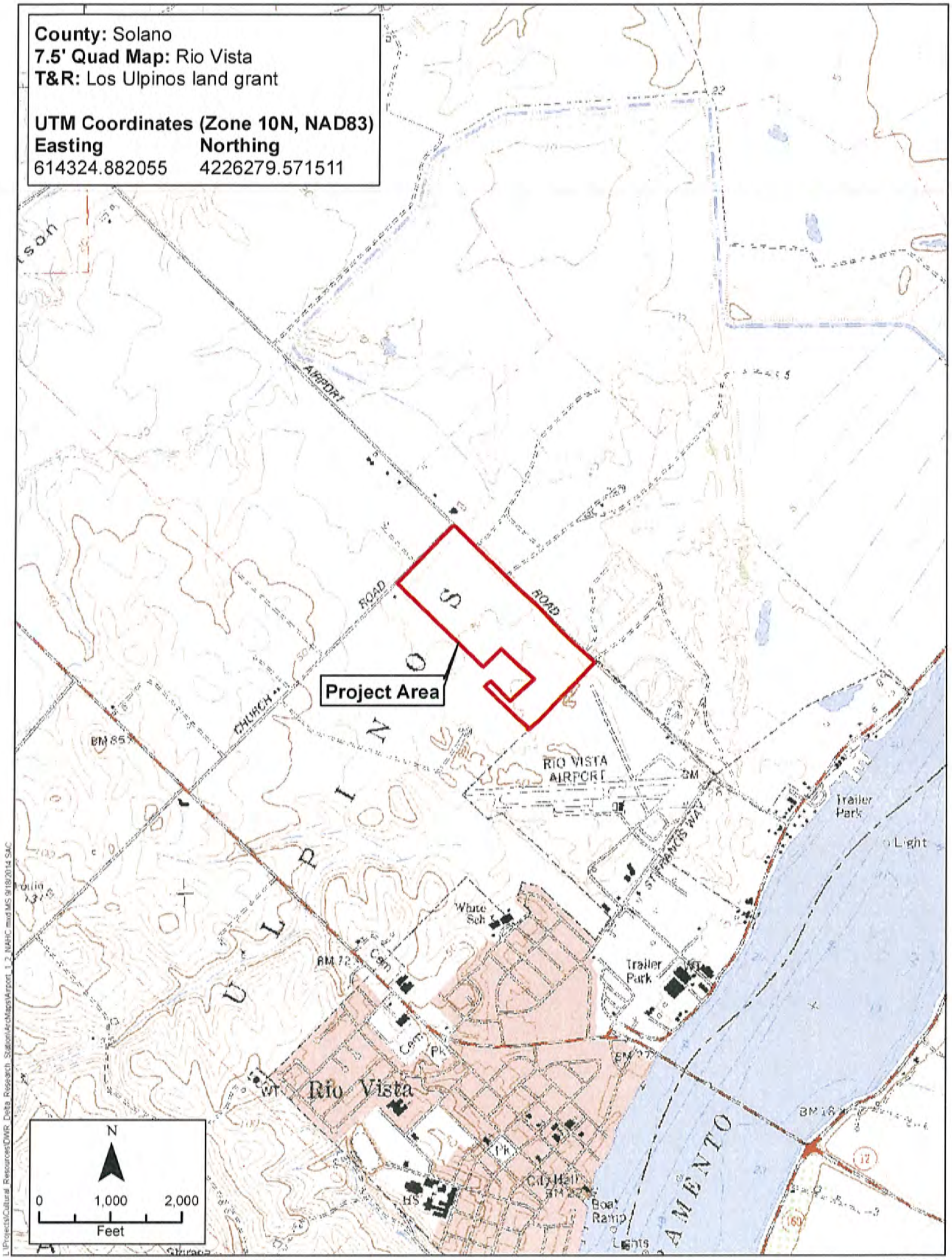
Email: janis.offermann@urs.com

Project Description:
Investigation of 2 parcels for the potential location of a research station and hatchery for the CA Dept. of Water Resources and CA Fish & Wildlife.



DWR Delta Research Station
Rio Vista Army Base

Figure 1



URS DWR Delta Research Station
Airport Road Site 1 & Site 2

Figure 1

Additional Information

- *California Native Americans*
- *Cultural Resources*
- *Strategic Plan*
- *Commissioners*
- *Federal Laws and Codes*
- *State Laws and Codes*
- *Local Ordinances and Codes*
- *Additional Information*
- *Return to CNAHC Home Page*

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95691
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Delta Research Station

County: San Joaquin

USGS Quadrangle

Name: West Stockton

Township: 1N Range: 6E Section(s): none

Company/Firm/Agency:
URS

Contact Person: Janis Offermann

Street Address: 2870 Gateway Oaks Drive, Suite 150

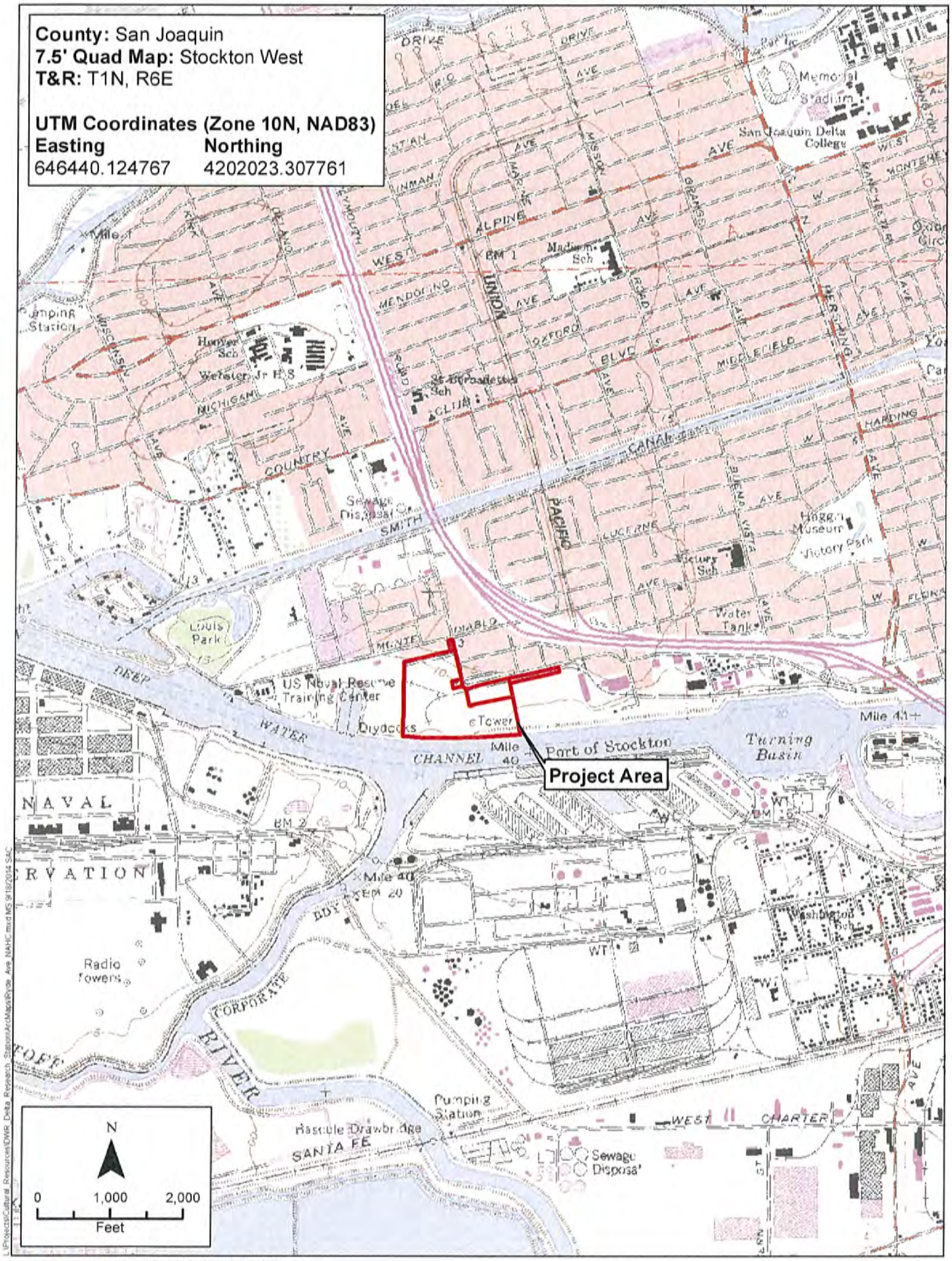
City: Sacramento Zip: 95833

Phone: (916) 679-2020

Fax: (916) 679-2000

Email: janis.offermann@urs.com

Project Description:
Investigation of a parcel for the potential location of a research station and hatchery for the CA Dept. of Water Resources and CA Fish & Wildlife.



URS DWR Delta Research Station
845 Ryde Avenue

Figure 1

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd.
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

October 6, 2014

Janis Offermann
URS
2870 Gateway Oaks Drive, Ste 150
Sacramento, CA 95833-4308

By: FAX~~916-679-2000~~ MAILED

3 Pages

Re: Delta Research Station project, San Joaquin and Solano Counties

Ms. Offermann,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3713.

Sincerely,

Layta Weston for
Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
San Joaquin and Solano Counties
October 6, 2014

Randy Yonemura
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randy_yonemura@yahoo.com
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West Point , CA 95255

Kesner Flores
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Wheatland , CA 95692
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California Valley Miwok Tribe
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This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Delta Research Station project, San Joaquin and Solano counties.

Native American Contacts
San Joaquin and Solano Counties
October 6, 2014

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Yocha Dehe Wintun Nation
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STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd.
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(916) 373-3710
Fax (916) 373-5471

October 6, 2014

Janis Offermann
URS
2870 Gateway Oaks Dr. Ste 150
Sacramento, CA 95833

By: FAX: ~~916-679-2000~~ MAILED

3 Pages

Re: Delta Research Station project, San Joaquin County

Ms. Offermann,

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Sincerely,

Leyta Wenston for

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
San Joaquin County
October 6, 2014

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Bay Miwok

Calaveras Band of Mi-Wuk Indians
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Miwok

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San Joaquin County
October 6, 2014

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URS

November 17, 2014

Ms. Katherine Erolinda Perez
PO Box 717
Linden, CA 95236

Dear Ms. Perez:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the ‘Rio Vista’ United States Geological Survey (USGS) 7.5’ topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the ‘Stockton West’ USGS 7.5’ topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the ‘Rio Vista’ United States Geological Survey (USGS) 7.5’ topographic quadrangle. The attached maps depict all of the locations discussed above.

A detailed project description of the DRS facilities is not available at this time. Sites of Native American concern were not identified at either location during the standard literature review, records search and pedestrian survey conducted by URS. Though no subsurface testing has been conducted, both sites were analyzed using existing data for their potential to harbor buried archaeological resources. Preliminary research indicates the Rio Vista locations have a low potential for buried resources while the Stockton location has moderate potential for buried resources.

The Native American Heritage Commission has identified you as an individual who might have concerns about, or additional knowledge of, ancestral cultural resources in the project area. Please notify me if you are aware of any areas of concern within or in close proximity to the project area. Early identification of Native American cultural resources will ensure their consideration during the project planning phase. If you have concerns, please respond within 45 days of receipt of this letter.

You may contact me directly at 916-679-2020 or janis.offermann@urs.com, or by mail at the address listed below. Thank you for your time in considering this request.

Sincerely,

Janis Offermann

Senior Cultural Resources Specialist

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000
Fax: 916.679.2900

URS

November 17, 2014

Mr. Randy Yonemura
4305 39th Avenue
Sacramento, CA 95824

Dear Mr. Yonemura:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The attached maps depict all of the locations discussed above.

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Senior Cultural Resources Specialist

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000
Fax: 916.679.2900

URS

November 17, 2014

Chairperson Rhonda Morningstar Pope
Buena Vista Rancheria
1418 20th St Ste 200
Sacramento, CA 95811

Dear Chairperson Morningstar Pope:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the ‘Rio Vista’ United States Geological Survey (USGS) 7.5’ topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the ‘Stockton West’ USGS 7.5’ topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the ‘Rio Vista’ United States Geological Survey (USGS) 7.5’ topographic quadrangle. The attached maps depict all of the locations discussed above.

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Janis Offermann

Senior Cultural Resources Specialist

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
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URS

November 17, 2014

Chairperson Gloria Grimes
Calaveras Band of Mi-Wuk Indians
PO Box 899
West Point, CA 95255

Dear Chairperson Grimes:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The attached maps depict all of the locations discussed above.

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Janis Offermann

Senior Cultural Resources Specialist

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Crown Corporate Center
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Sacramento, CA 95833
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URS

November 17, 2014

Ms. Debra Grimes
Cultural Resources Specialist
Calaveras Band of Mi-Wuk Indians
PO Box 1015
West Point, CA 95255

Dear Ms. Grimes:

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You may contact me directly at 916-679-2020 or janis.offermann@urs.com, or by mail at the address listed below. Thank you for your time in considering this request.

Sincerely,

Janis Offermann

Senior Cultural Resources Specialist

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000
Fax: 916.679.2900

URS

November 17, 2014

Mr. Adam Lewis
Tribal Preservation Assistant
Calaveras Band of Mi-Wuk Indians
PO Box 899
West Point, CA 95255

Dear Mr. Lewis:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The attached maps depict all of the locations discussed above.

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URS

November 17, 2014

Chairperson Silvia Burley
California Valley Miwok Tribe
1601 N Escondido Pl
Stockton, CA 95212

Dear Chairperson Burley:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The attached maps depict all of the locations discussed above.

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URS

November 17, 2014

Chairperson Yvonne Miller
Ione Band of Miwok Indians
PO Box 699
Plymouth, CA 95669

Dear Chairperson Miller:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The attached maps depict all of the locations discussed above.

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URS

November 17, 2014

Chairperson Anthony Burris
Ione Band of Miwok Indians Cultural Committee
PO Box 699
Plymouth, CA 95669

Dear Chairperson Burris:

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URS

November 17, 2014

Chairperson Raymond Hitchcock
Wilton Rancheria
9300 W Stockton Ste 200
Elk Grove, CA 95758

Dear Chairperson Hitchcock:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location. The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Two potential locations have also been identified for the fish hatchery. These include the Stockton site discussed above, and another site in Rio Vista located on Airport Road. The Rio Vista fish hatchery location is also depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The attached maps depict all of the locations discussed above.

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URS

November 17, 2014

Mr. Steven Hutchason
Executive Director, Environmental Resources
Wilton Rancheria
9300 W Stockton Ste 200
Elk Grove, CA 95758

Dear Mr. Hutchason:

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URS

November 17, 2014

Mr. Kesner Flores
PO Box 1047
Wheatland, CA 95692

Dear Mr. Flores:

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URS

November 17, 2014

Chairperson Charlie Wright
Cortina Band of Indians
PO Box 1630
Williams, CA 95987

Dear Chairperson Wright:

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URS

November 17, 2014

Chairperson Marshall McKay
Yocha Dehe Wintun Nation
PO Box 18
Brooks, CA 95606

Dear Chairperson McKay:

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URS

November 17, 2014

Mr. Leland Kinter
Native Cultural Renewal Committee
Yocha Dehe Wintun Nation
PO Box 18
Brooks, CA 95606

Dear Mr. Kinter:

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URS

November 17, 2014

Ms. Cynthia Clarke
Native Cultural Renewal Committee
Yocha Dehe Wintun Nation
PO Box 18
Brooks, CA 95606

Dear Ms. Clarke:

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URS

December 18, 2014

Ms. Lois Martin
Chairperson
Southern Sierra Miwuk Nation
PO Box 186
Mariposa, CA 95338

Dear Chairperson Martin:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS). The DRS would provide improved and additional facilities for the Interagency Ecological Program, a collaborative program seeking to provide accurate and useful information to support adaptive management of the Delta and conservation of Delta ecosystems.

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  2. Co-locate the research station with a facility capable of studying fish in captivity (i.e., the FTC); and
  3. Provide facilities to conduct monitoring and research on the Bay-Delta's aquatic resources.
- FTC -
  1. Develop captive propagation technologies for the Bay-Delta's rare fish species;
  2. Test and refine the captive propagation techniques;
  3. Locate the facility where suitable water quality and quantity are available, and ability to discharge waste water given its various functions and operations is available; and
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The project team has selected two California sites for the potential use as the FTC/ERS. The locations are Rio Vista Army Base – Beach Drive, Rio Vista and Ryde Avenue in Stockton, California. The Rio Vista location is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' United States Geological Survey (USGS) 7.5' topographic quadrangle. The Stockton location is depicted within unsectioned lands at Township 1 North, Range 6 East of the 'Stockton West' USGS 7.5' topographic quadrangle. Please see the attached maps for the project locations.

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URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000
Fax: 916.679.2900

The Native American Heritage Commission has identified you as an individual who might have concerns about, or additional knowledge of, ancestral cultural resources in the project areas. Please notify me if you are aware of any areas of concern within or in close proximity to these locations. Early identification of Native American cultural resources will ensure their consideration during the project planning phase. If you have concerns, please respond within 45 days of receipt of this letter.

You may contact me directly at 916-679-2020 or janis.offermann@urs.com, or by mail at the address listed below. Thank you for your time in considering this request.

Sincerely,

Janis Offermann
Senior Cultural Resources Specialist

URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833
Tel: 916.679.2000
Fax: 916.679.2900

December 18, 2014

Mr. Les James

Southern Sierra Miwuk Nation
PO Box 1200
Mariposa, CA 95338

Dear Mr. James:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS). The DRS would provide improved and additional facilities for the Interagency Ecological Program, a collaborative program seeking to provide accurate and useful information to support adaptive management of the Delta and conservation of Delta ecosystems.

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URS

December 18, 2014

Ms. Pamela Baumgartner
Tribal Administrator
Ione Band of Miwok Indians
PO Box 699
Plymouth, CA 95669

Dear Ms. Baumgartner:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS). The DRS would provide improved and additional facilities for the Interagency Ecological Program, a collaborative program seeking to provide accurate and useful information to support adaptive management of the Delta and conservation of Delta ecosystems.

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URS

December 18, 2014

Ms. Tina Reynolds
Executive Secretary
Ione Band of Miwok Indians
PO Box 699
Plymouth, CA 95669

Dear Ms. Reynolds:

The California Department of General Services (DGS), California Department of Water Resources (DWR), and United States Fish and Wildlife Service (USFWS) have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS). The DRS would provide improved and additional facilities for the Interagency Ecological Program, a collaborative program seeking to provide accurate and useful information to support adaptive management of the Delta and conservation of Delta ecosystems.

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Sincerely,

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CALIFORNIA VALLEY MIWOK TRIBE

10601 N. Escondido Pl., Stockton, CA 95212 Ph: (209) 931.4567 Fax: (209) 931.4333
http://www.californiavalleymiwoktribe-nsn.gov Email: office@cvmt.net

December 10, 2014

Janis Offerman
Senior Cultural Resource Specialist
URS Corporation
Crown Corporate Center
2870 Gateway Oaks Drive, Suite 150
Sacramento, California 95833

Re: Two California sites for the potential use as the FTC/ERS

Dear Ms. Offerman,

The California Valley Miwok Tribe (CVMT) is in receipt of your letter (dated November 17, 2014) regarding the California Dept. of General Services (DGS), California Dept. of Water Resources (DWR) and the U.S. Fish and Wildlife Services (USFWS) having had joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS). The DRS will include a Fish Technology Center (FTC) and Estuarine Research Station (ERS) at one location, and a fish hatchery at a second location.

COMMENTS:
The California Valley Miwok Tribe has no interest in any projects that are within Sacramento County. CVMT has concerns with the Ryde Avenue in Stockton site since it has moderate potential for buried resources. Therefore, the California Valley Miwok Tribe requests that it be notified if any Miwok artifacts and/or human remains are discovered within the proposed Ryde Avenue in Stockton site project location.

Respectfully,

Silvia Burley, Chairperson
s.burley@californiavalleymiwoktribe-nsn.gov

Tribal Council

Marshall McKay
Chairman

James Kinter
Secretary

Anthony Roberts
Treasurer

Mia Durham
Member

Matthew Lowell, Jr.
Member

December 15th, 2014

Janis Offerman
Senior Cultural Resources Specialist
URS
2870 Gateway Oaks Drive, Suite 150
Sacramento Ca 95833

RE: Delta Research Station, Rio Vista Army Base, Rio Vista, Solano County, CA

Dear Ms. Offerman:

Thank you for your comment request letter dated November 17, 2014 regarding the proposed Delta Research Station, Rio Vista Army Base project, Rio Vista, Solano County, CA. We appreciate your effort to contact us.

The Cultural Resources Department has reviewed the project and concluded that it is within the aboriginal territories of the Yocha Dehe Wintun Nation. Therefore, we have cultural interest and authority in the proposed project area.

Based on the information provided, Yocha Dehe Wintun Nation is not aware of any known cultural resources near this project. However, we would like you to consider the potential impacts of cultural resources in the area during your planning phase.

We would like more information on your project. Would you please send us the following information: approximate date of the project and mitigation measures for the project?

Should you have any questions, please feel free to contact the following individual:

Mr. James Sarmento
Cultural Resources Manager
Yocha Dehe Wintun Nation
Office: (530) 723-0452, Email: jsarmento@yochadehe-nsn.gov

Please refer to identification number YD –11252014-02 in any correspondences concerning this project.

Thank you for providing us with this notice and the opportunity to comment.

Sincerely,

Marshall McKay
Tribal Chairman

MM:rr

From: Offermann, Janis
Sent: Monday, February 23, 2015 2:35 PM
To: 'sharol@ionemiwok.org'
Subject: Delta Research Station information request letter
Attachments: Baumgartner letter.pdf; RioVista_Army_Base_topo.pdf; Ryde_Ave_topo.pdf

Hi, Sharol
Attached please find the letter that I sent to Ms. Baumgartner in December, along with maps of the two proposed project locations. I should note that we also sent a letter to Ms. Tina Reynolds at the same time. Prior to that, in November, we had contacted Chairperson Miller and Anthony Burris and, in follow up phone calls, they had no concerns.

I look forward to hearing from you. Please don't hesitate to get back to me with any questions you might have.

Thank you for your time.
janis

Janis Offermann, MA, RPA
Senior Cultural Resources Specialist
D 1-916-679-2020 C 1-916-284-7142
Janis.offermann@aecom.com

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www.aecom.com

URS

December 18, 2014

Ms. Pamela Baumgartner
Tribal Administrator
Ione Band of Miwok Indians
PO Box 699
Plymouth, CA 95669

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Janis Offermann

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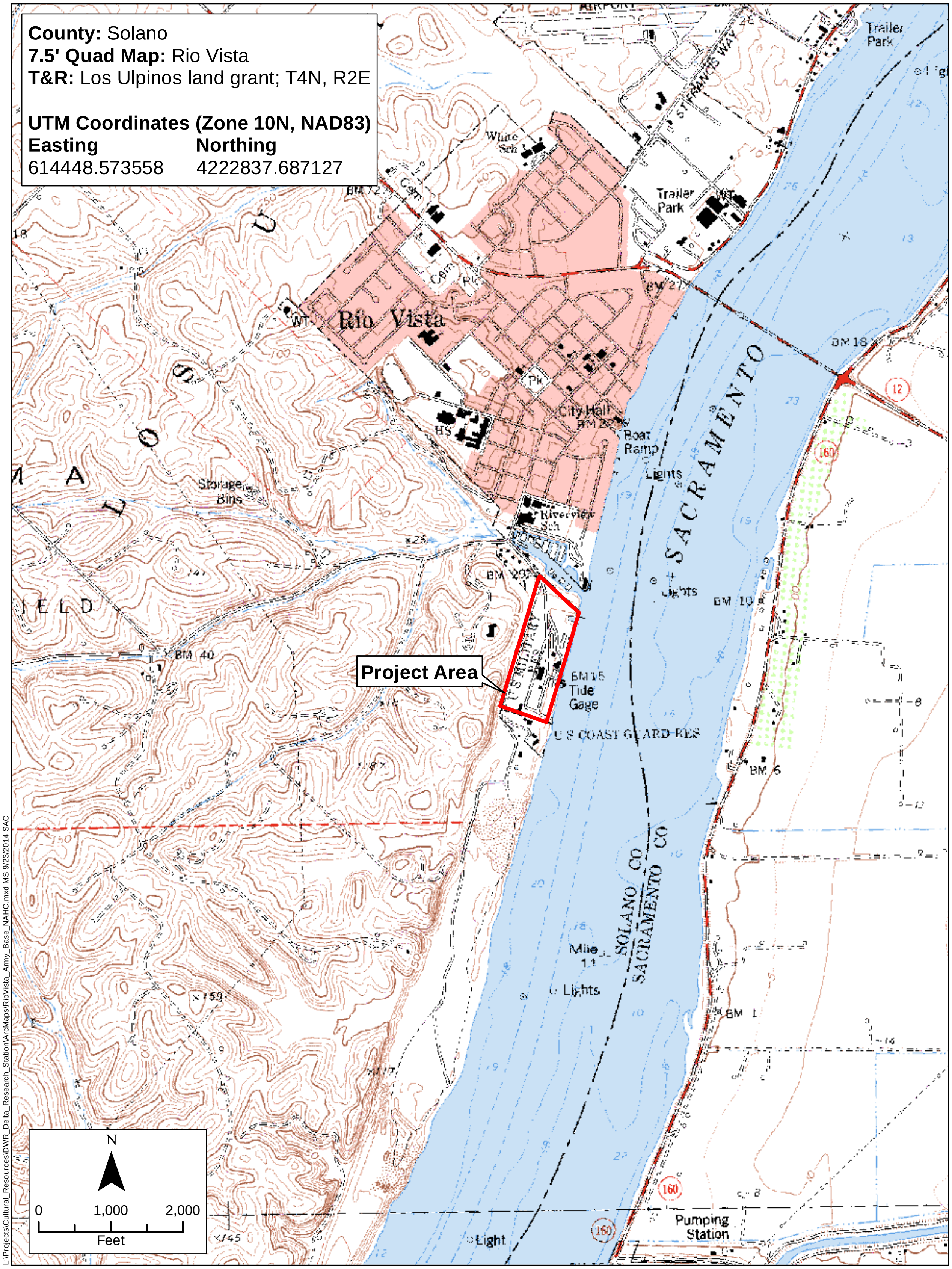

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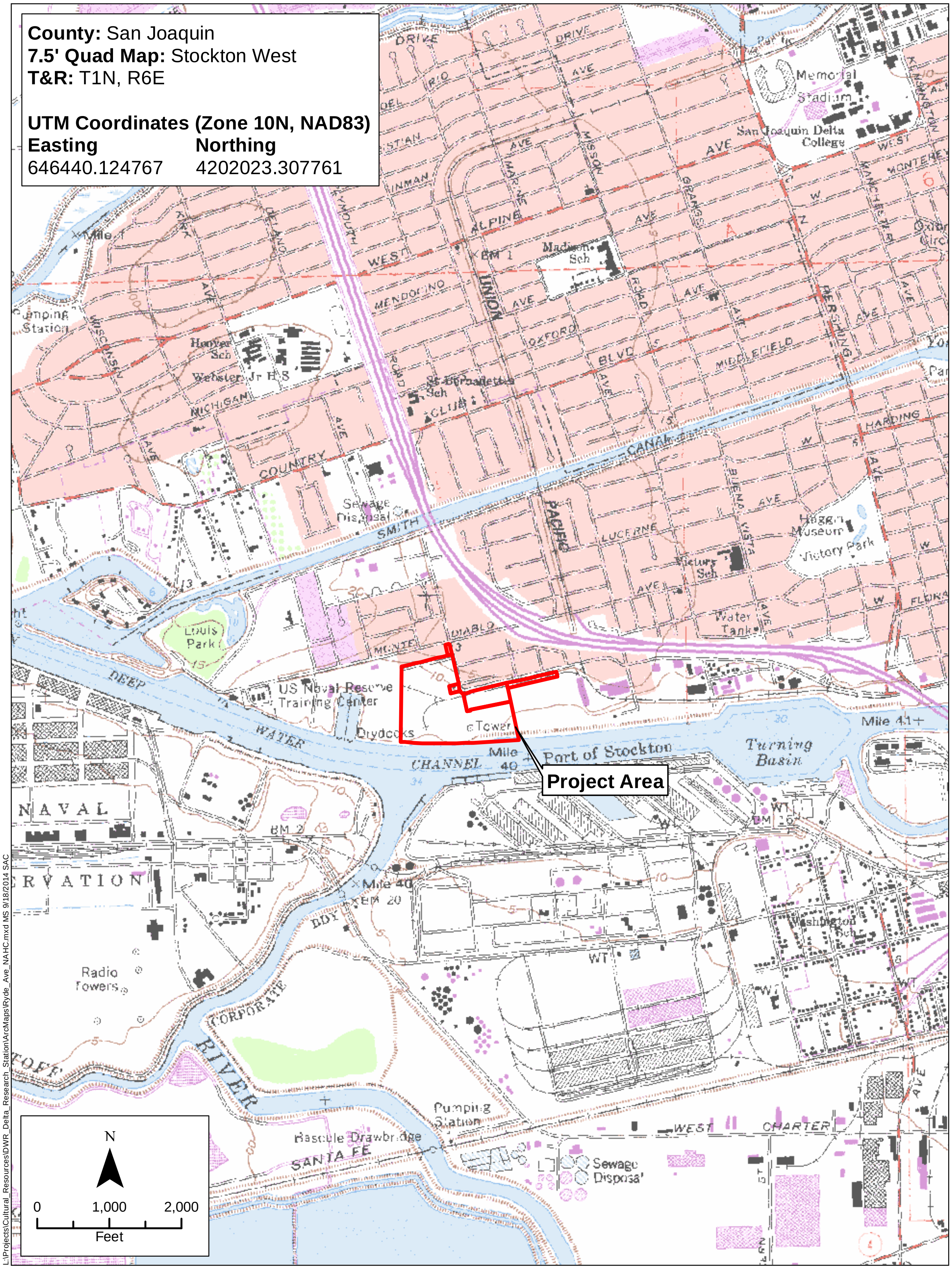
URS DWR Delta Research Station
Rio Vista Army Base

Figure 2



DWR Delta Research Station
845 Ryde Avenue

Figure 1

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From: Sharol McDade <sharol@ionemiwok.org>
Sent: Monday, February 23, 2015 2:40 PM
To: Offermann, Janis
Subject: Re: Delta Research Station information request letter

Hi Janis,

I will forward this to Andrew Ramey, who has assumed the prior duties of Anthony Burris, and the Cultural Committee Chairperson, who is now Kyle Dutschke.

Thank you,

Sharol McDade

On Mon, Feb 23, 2015 at 2:34 PM, Offermann, Janis <janis.offermann@aecom.com> wrote:

Hi, Sharol

Attached please find the letter that I sent to Ms. Baumgartner in December, along with maps of the two proposed project locations. I should note that we also sent a letter to Ms. Tina Reynolds at the same time. Prior to that, in November, we had contacted Chairperson Miller and Anthony Burris and, in follow up phone calls, they had no concerns.

I look forward to hearing from you. Please don't hesitate to get back to me with any questions you might have.

Thank you for your time.

janis

Janis Offermann, MA, RPA
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Sharol L. McDade
Administrator
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(775) 276-8152 - cell
(209) 245-5800 ext. 10
(209) 245-3112 - fax

Appendix B

CHRIS Information Center Results

This appendix contains confidential information that has been removed from the public copy of this report.

Appendix I
HISTORICAL ARCHITECTURAL EVALUATION FOR THE DELTA RESEARCH STATION

This appendix contains the historical architectural evaluation prepared for the DRS. The document reports the findings of an evaluation of the built environment resources at the Rio Vista Army Reserve Center, the proposed location of DRS facilities in Alternatives 2 and 3. The built environment survey consisted of a literature review to identify any previously recorded historic properties that could be affected by the DRS, and a field inventory to record the current condition of the buildings that are extant at the Army Reserve Center.

TECHNICAL REPORT—FINAL

HISTORIC ARCHITECTURAL EVALUATION FOR THE DELTA RESEARCH STATION

SOLANO COUNTY, CALIFORNIA

Prepared by:
Kara Brunzell, MA, Historian
Brunzell Historical
1613 B Street
Napa, CA 94559

Prepared for:
URS Corporation
2870 Gateway Oaks Drive, Suite 150
Sacramento, CA 95833

July 2015

This report contains confidential cultural resources location information; report distribution should be restricted to those with a need to know. Cultural resources are non-renewable, and their scientific, cultural and aesthetic values can be significantly impaired by disturbance. To deter vandalism, artifact hunting, and other activities that can damage cultural resources, the locations of cultural resources should be kept confidential. The legal authority to restrict cultural resources information is in California Government Code 6254.1 and the National Historic Preservation Act of 1966, as amended, Section 304.

Table of Contents

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Appendices

List of Acronyms

CCR	California Code of Regulations
CDC	California Debris Commission
CFR	Code of Federal Regulations
COE	United States Army Corps of Engineers
CRHR	California Register of Historical Resources
DGS	California Department of General Services
DRS	Delta Research Station
DWR	California Department of Water Resources
EIR	Environmental Impact Report
IEP	Interagency Ecological Program
LARC	Lighter Amphibious Resupply Cargo
NRHP	National Register of Historic Places
NWIC	Northwest Information Center
SHPO	State Historic Preservation Officer
SRFCP	Sacramento River Flood Control Project
URS	URS Corporation
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

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1 Summary of Findings

The California Department of Water Resources (DWR) and United States Fish and Wildlife Service (USFWS), with assistance from the California Department of General Services (DGS), have joined together to plan and develop a joint-use field research facility referred to as the Delta Research Station (DRS or proposed project). The DRS will include an Estuarine Research Station (ERS) and Fish Technology Center (FTC). This document reports the findings of an evaluation of the built environment resources at the Army Reserve Center property in Rio Vista, California, which is one of the possible locations selected for the FTC/ERS facilities.

This report documents the built environment inventory methods and results as required for compliance with federal and California regulations. The built environment survey consisted of a literature review to identify any previously recorded historic properties that could be affected by the proposed project, and a field inventory to record the current condition of the buildings that are extant at the Army Reserve Center.

Research determined that the Army Reserve Center had previously been evaluated for eligibility to the National Register of Historic Places (NRHP) in the late 1990s (JRP 1997) as an eligible district. However, the U.S. Army Corp of Engineers (COE), who sponsored the study, did not agree with JRP's eligibility determination, and the State Historic Preservation Officer (SHPO) concurred with the COE's conclusions. Although the Draft Environmental Impact Report prepared by the City of Rio Vista (2010) for the redevelopment of the Army Reserve Center states that the property is eligible as a district for the California Register of Historical Resources (CRHR), there is no evidence that the district has been formally evaluated for the CRHR. As a result, this document serves as an evaluation of the property for eligibility to the CRHR. The report concludes that the 14 buildings and structures that comprise the core of the complex appear to be collectively eligible to the CRHR under Criterion 1 as the U.S. Engineers Storehouse Historic District for their association with the Sacramento River Flood Control Project (SRFCP), a large and historically significant California public works project.

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2 Introduction

2.1 Project Location and Setting

The Army Reserve Center property is on the west bank of the Sacramento River approximately 14 miles upstream of the Sacramento-San Joaquin River confluence (Figure 1). It is a low lying area subject to tidal fluctuations and, prior to implementation of flood control and reclamation systems, it was a wetland. The property is depicted as within a wetland on the 1910 Rio Vista United States Geological Survey (USGS) 7.5' topographic. At some point between 1910 and 1919 fill soils were imported and placed on the property to raise its elevation and make the land useable. Between 1919 and 1944 it was used by the COE as the primary staging area for the construction of levees in the Delta as part of the SRFCP (See Section 3). Numerous buildings were constructed to support this effort. Aerial photography indicates continuous improvements were made on the property until 1970. Having gone through several incarnations as a military installation from the early 20th century into the 1990s before being purchased by the City of Rio Vista, the Rio Vista location is characterized by buildings and structures in various states of disrepair, roadways and paved surfaces, several docks along the river, supporting infrastructure, and unmaintained ornamental trees and vegetation.

This Rio Vista location covers approximately 28 acres. It is depicted within unsectioned land of the Los Ulpinos Mexican Land Grant at Township 4 North, Range 2 East on the 'Rio Vista' USGS 7.5' topographic quadrangle (Figure 2).

2.2 Project Description

The Delta Research Station (DRS) is a proposed science and research center in the Delta. The planned DRS would consist of two facilities, a proposed Estuarine Research Station (ERS) and Fish Technology Center (FTC). The ERS would provide improved and additional facilities for the Interagency Ecological Program (IEP), a collaborative program seeking to provide accurate and useful information to support adaptive management of the Delta and conservation of Delta ecosystems. The FTC would house refuge populations of special-status fishes such as Delta Smelt, and provide a location for management-oriented studies.

The specific objectives of each component of the DRS are as follows:

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    4. Co-locate the FTC with a facility conducting conservation research on Bay-Delta rare fish species (i.e., the ERS)."

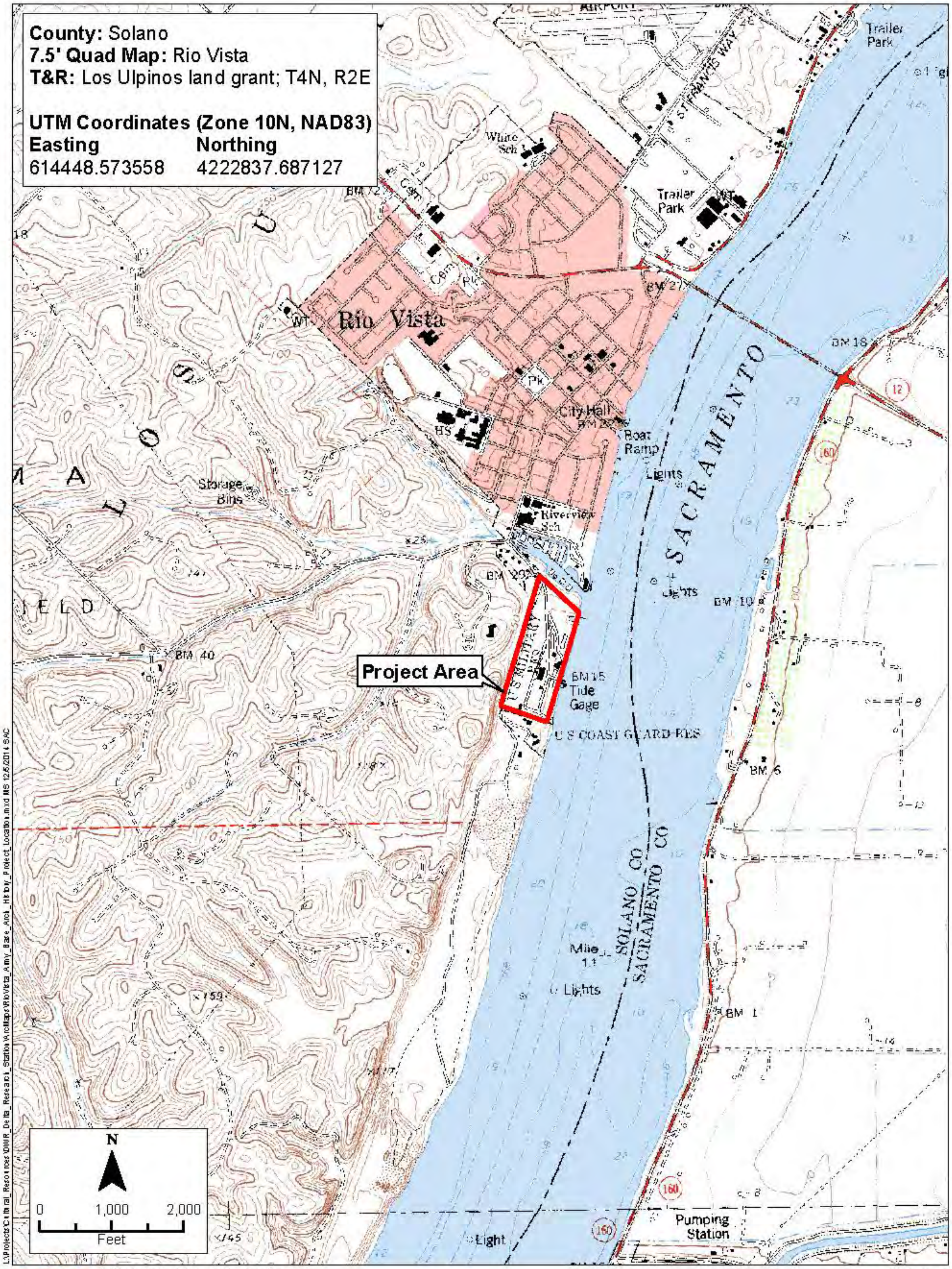
2.3 Personnel

The fieldwork, analysis, and reporting were performed by professionals qualified under the Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 Code of Federal Regulations § 44716 [National Park Service, 1983]). Personnel performed field survey and archival research during September and October, 2014.

Kara Brunzell served as Historian/Architectural Historian for the Project. Ms. Brunzell has a B.A. in History from the University of California, Los Angeles and an M.A. in public history from Sacramento State University (California). She has seven years of experience in historic preservation and cultural resource management.

URS DWR Delta Research Station
Rio Vista Army Base

Figure 1
Project Vicinity



URS DWR Delta Research Station
Rio Vista Army Base

Figure 2
Project Location

3 Research Methods and Results

3.1 Archival Research

An archival records search of the Rio Vista site and a 0.25-mile buffer was conducted by staff of the Northwest Information Center (NWIC), an affiliate of the California Office of Historic Preservation's California Historical Resources Information System on May 30, 2014. The NWIC records search did not identify any previously recorded built environment resources at the Army Reserve Center or within the 0.25-mile buffer.

Additional archival research of the Rio Vista site was undertaken by Kara Brunzell on September 30, 2014 at the City of Rio Vista and the Solano County Archive in Fairfield, California. In addition, Ms. Brunzell performed research on October 11, 2014 at the Rio Vista Museum; on October 16, 2014 at the National Archives in San Bruno, California; and on October 17, 2014 at the Rio Vista Library.

3.2 Previous Studies

The Delta Research Station property has been the subject of several previous studies. In 1997, JRP Historical undertook an evaluation of the property, which was known as the Rio Vista Army Reserve Center, for the U.S. Army. The consultant concluded that the base appeared eligible for the NRHP. The Army, however, did not agree with this assessment, and California's Office of Historic Preservation concurred with the Army. As a result, the property was never determined eligible for or listed on the NRHP or other historic register.

The City of Rio Vista prepared an Environmental Impact Report (EIR) on the property in 2010, which was by then owned by the City. The EIR refers to the JRP Evaluation, and states that 12 buildings and structures appear collectively eligible to the CRHR. In 2011, the City of Rio Vista retained planning consultant MIG to create "Army Base District Design Guidelines, City of Rio Vista, California". The design guidelines also state that 12 buildings and structures appear to be collectively eligible to the CRHR.

Despite statements regarding CRHR eligibility, the property was not formally evaluated for CRHR eligibility in the course of any of these studies.

3.3 Architectural History Survey Results

Architectural history field survey of the property was performed by Kara Brunzell on September 10, 2014, and a follow-up site visit was undertaken on September 30, 2014. The Delta Research Station property includes fifteen buildings and six structures that were constructed between 1919 and 1960. The buildings include ship repair facilities, warehouses, barracks, piers, wharfs, a water tower, and ancillary buildings such as sheds and pump houses. Most appear to have been constructed as part of flood control efforts that were administered from the site between 1913 and 1951.

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4 Historic Context and Use

4.1 Historic Context

4.1.1 California Debris Commission and Sacramento River Flood Control

Large numbers of Americans began settling in California's Central Valley during and after the Gold Rush, at first to mine gold and then to farm the fertile valley floor. They immediately discovered that the low-lying areas were extremely vulnerable to flooding. The highly variable volume of flow and the relatively narrow channel of the Sacramento River were natural conditions that resulted in regular flooding of large portions of the valley floor near rivers and tributaries. Although early maps of the area showed large expanses of marshland, (indicating that settlers were aware of these conditions), they nevertheless settled in these vulnerable areas in large numbers.[1]

Hydraulic mining, the practice of using giant water hoses to wash away hillsides and expose valuable minerals, was practiced in California's Gold Country by the 1850s. Use of the technology increased dramatically in the 1860s and 1870s, and enormous volumes of tailings washed into the Sacramento and San Joaquin Rivers and their tributaries. The addition of huge amounts of debris to the river system's channels exacerbated the naturally occurring propensity for flooding in the Central Valley, resulting in repeated disastrous inundation and damage to property and loss of life. Individual land owners and levee districts began constructing levees to protect localities as early as the 1850s. These piecemeal local projects led to "levee wars" in the 1860s and 1870s, in which levees protecting specific locales forced water back into the main channel and worsened overall flooding. In 1884, Judge Lorenzo Sawyer effectively ended hydraulic mining in California in a landmark decision that prohibited the discharge of debris into the state's waterways. The problems caused by the debris, however, remained. In 1893, the federal Caminetti Act allowed the resumption of hydraulic mining, but created the California Debris Commission (CDC) to regulate it. U.S. President Grover Cleveland appointed three officers of the COE to the CDC. In addition to flood protection, the government charged the commission with improving navigation in California's Rivers for the benefit of commerce, and the body was given the power to build levees, dams, and other works. The CDC's power, which included authority over private hydraulic mining operations, was virtually unprecedented.[2]

4.1.2 Sacramento River

Even before the formation of the CDC, the COE was involved in improving navigation on the Sacramento and San Joaquin rivers. Activities included survey, snag removal, wing-dam construction, and some dredging. The individual projects, however, were generally limited in scope,

1 L. Allan James and Michael B. Singer, "Development of the Lower Sacramento River Flood-Control System: Historical Perspective," Natural Hazards Review, Vol. 9, No. 3, American Society of Civil Engineers, August 1, 2008, p. 125 – 126.

2 Joseph J. Hagwood, The California Debris Commission, U.S. Army Corps of Engineers, Sacramento District, 1981, p. 26; James and Singer, p. 127, 130; Hagwood, p. 31.

due to limited funding. The CDC in its early years lacked the vision required to effectively control flooding throughout the system. Like the public, the COE had long been biased in favor of a single channel approach that relied exclusively on high levees for flood protection. After repeated levee failures, however, public opinion began to shift. In 1894, the Manson-Grunsky Report presented a detailed comprehensive plan based on data collected over a period of decades. The plan proposed a system of bypasses and control weirs to move water out of the main river channel during floods while protecting most farmland. Levees remained an important component of the plan, but it allowed for the control of larger flood volumes than the old levee-only system. By 1907, the CDC had completed extensive surveys of the waterways, and finally realized that the system needed a comprehensive plan for flood control, navigation, and debris management. The CDC put forth the "Jackson Report," (named for commission member Thomas H. Jackson), in 1910. The approach outlined in the report included river bank levee construction, bypass construction, weirs to route flood waters from river to bypasses, and the enlargement of the channel by dredging between Cache Slough and Suisun Bay. The major elements of the Jackson Report were identical to the suggestions put forward by the Manson-Grunsky Report over 15 years before.[3]

The San Joaquin and Sacramento river system was essential transportation infrastructure at the turn of the twentieth century, making the project one of vital economic importance. In 1910, the system of waterways was carrying $60,000,000 worth of freight and 300,000 passengers annually. Many farms located near the river system had no railroad access and relied solely on the waterways for shipping agricultural produce. Local boosters were well aware of the value of navigable rivers as well as the dangers of flooding, and in 1909, several hundred Sacramento Delta property owners met in Rio Vista and formed the San Joaquin and Sacramento River Improvement Association. More than an advocacy organization, the group complemented government efforts to improve the system by raising money to acquire the rights of way between Rio Vista and Collinsville, (which were necessary for the widening of the lower channel, popularly known as "uncorking" the river). In 1910, Congress passed a River and Harbor Act that provided for carrying out the suggestions of the Jackson Report, but only partially funded the project. The State of California, which had already been working closely with the COE, formed the California Reclamation Board and matched federally appropriated funds, bringing the total available funding to $800,000.[4]

In early 1912, the COE contracted with the Ellicott Machine Co. of Baltimore for two hydraulic dredges, which were assembled in Pittsburgh, California. Christened the Sacramento and the San Joaquin, the dredges were capable of removing vast quantities of material from the river bed. Toward the end of the year, the COE also commissioned a dredge tender, the Rio Vista. These large dredges needed a new mooring ground, as the City of Sacramento waterfront used by the COE was becoming too crowded. Rio Vista was on the lower stretch of the Sacramento River, near Horseshoe Bend, an obstruction that slowed the Sacramento's flow. Straightening this bend and increasing the

3 James and Singer, 131; Hagwood, p. 49 – 50; James and Singer, p. 131.

4 Report of the Chief of Engineers, U.S. Army, Part 1, Washington, D.C.: Government Printing Office, 1910, p. 1012; Captain A.E. Anderson, "Sacramento River to be Widened as Part of Larger Plan for Controlling Flood Waters," San Francisco Call, August 4, 1912, 61:1-3; Hagwood, p. 52.

carrying capacity of the Sacramento near its mouth was a crucial element of the larger project, making Rio Vista a good location for the base. In addition, it was easily accessible from the San Joaquin and Mokelumne Rivers, where related projects were taking place, and was therefore chosen as the site of the U.S. Engineers Storehouse. The COE located the Rio Vista base just to the south of the town, and constructed a 120' x 44' wharf with a 56' x 26' warehouse located on the wharf.[5]

4.1.3 U.S. Engineers Storehouse, Rio Vista[6]

The 32 acre site the COE acquired for the storehouse was south of the town of Rio Vista on the west bank of the river. In the mid-nineteenth century, the area was part of John Bidwell's Rancho Los Ulpinos. Later, the tract was acquired by the Joseph family. The COE took possession of the site in July, 1911. Up until the period when the COE began intensively developing the Rio Vista base, the entire area along the western bank of the river was a swampy marsh.[7]

Between July, 1912 and June 1913 most of the COE's work in the Sacramento River was oriented toward maintaining sufficient depth for navigation: removing logs and snags between Sacramento and Red Bluff, dredging an obstruction, repairing wing dams near the American River, sounding and surveying, and repairing the snagboat. Spending to complete these limited projects was $34,078.94. The work picked up steam, however, after the federal government passed the Flood Control Act of 1917. This act marked the beginning of the Sacramento River Flood Control Project (SRFCP) and a transition for the COE, which began to focus as much on flood control as on aiding navigation. In the 1920 fiscal year, the COE dredged over 5,000,000 cubic yards of material. Although the bulk of the material dredged was from the crucial Horseshoe Bend area south of the storehouse, dredging also took place on the San Joaquin River, at Mare Island, and in various sloughs. Contracts with private companies for both clamshell and hydraulic dredges supplemented the work of the Sacramento and San Joaquin. In addition to dredging activities, the COE constructed levees from dredging spoils, planted grass and trees on levees, and worked on bypass weirs. By 1920, the state and federal government had spent a combined $3,700,000 on the project.[8]

5 Report of the Chief of Engineers, U.S. Army, Part 1, Washington, D.C.: Government Printing Office, 1913, p. 3173-3175.

6 During its first decade of use the site was referred to as the U.S. Engineers Storehouse or U.S. engineer storehouse at Rio Vista. The name seems to have been informal, and usage shifted over the years. By the late 1930s, maps created by the COE referred to the U.S. Engineer Depot. This name persisted into the 1940s, although it was also referred to as U.S. Engineer Plant and U.S. Engineer Yard. In 1952, just before it is transferred to the Transportation Corps, it is referred to as U.S. Engineer Dockyard. After its re-designation as Rio Vista Transportation Corps Marine Depot, usage continued to shift. During the 1950s and 1960s the site was also referred to as U.S. Army Transportation Storage Activity, Rio Vista Depot Activity, Rio Vista Storage Area, and U.S. Army Reserve Activity.

7 JRP Historical Consulting Services, Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, Solano County, California, Draft, February, 1997, p. 6; Topographical Map, Rio Vista Quadrangle, California, U.S. Geological Survey, Edition of May 1910.

8 U.S. Army, Part 1, 1913, p. 1299; James and Singer, p. 131; Report of the Chief of Engineers, U.S. Army, Part 2, Washington, D.C.: Government Printing Office, 1920, p. 2974 – 2975, 2979.

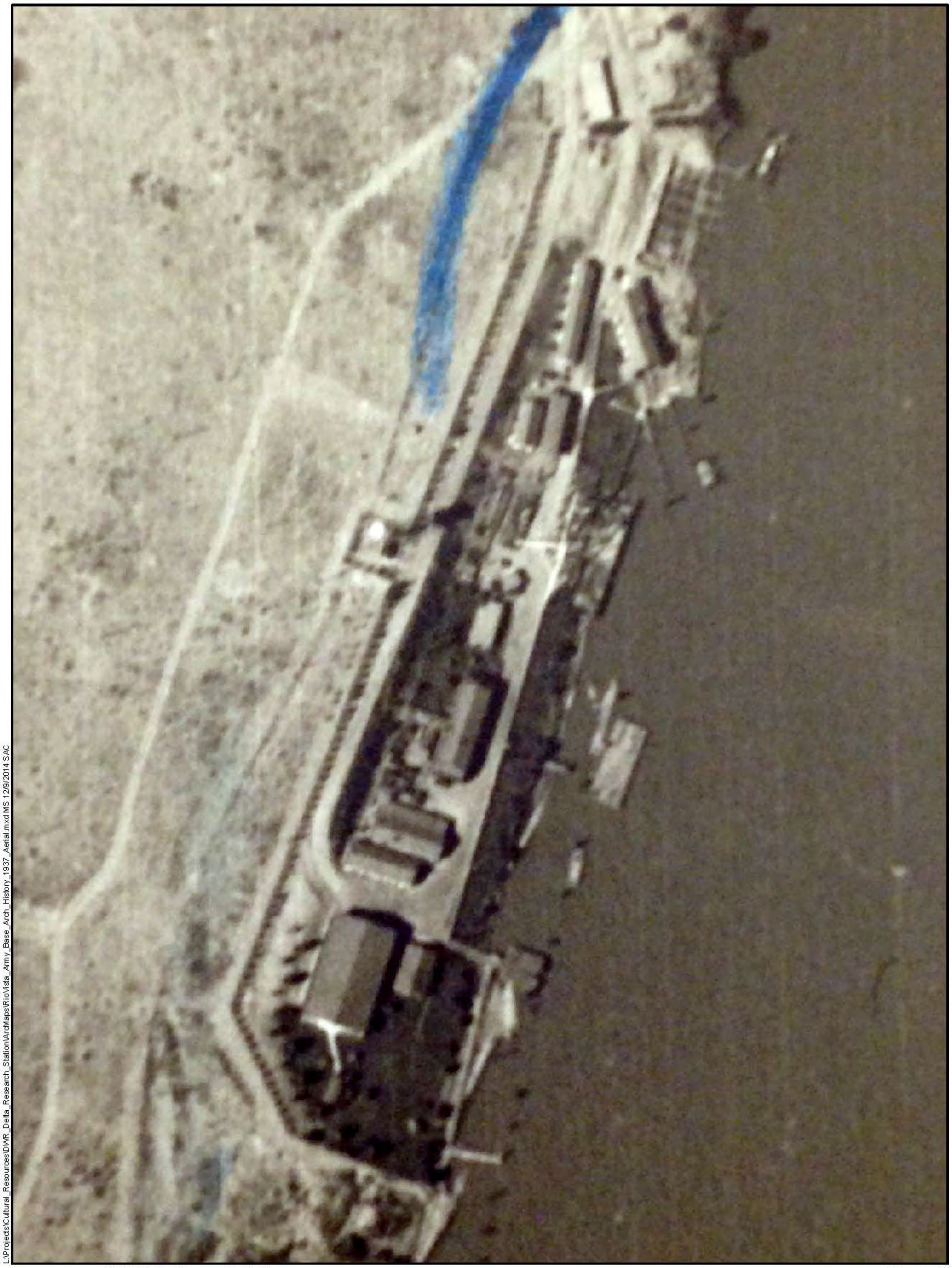
Expansion of federal funding in 1917 justified increased expenditures on the Rio Vista base. In 1917, a request to install telephone service at the base (when telephones were still rare in the U.S.) was approved. In 1920, the COE moved the existing structures roughly ¼ mile southwest, outside the project channel and into the area that would become the core of the complex. In all likelihood, the ground on which the buildings are sited was created by the COE when marsh land was filled with dredging spoils during project work. By 1920, the Carpenter Shop (T-7) and original Marine Ways, (no longer extant), were also present. A lumber shed, (which was probably later incorporated into Building T-11), had been constructed by 1923, and by 1929 the there was a cluster at least 7 buildings. Uses included a storehouse, bunkhouse, carpenter shop, welding shop, paint storage, and pattern shed. In addition to the buildings, wharf, and marine ways, the property also had a derrick.

The COE's work began to have a measurable effect by the 1920s. The dredging work performed, in addition to the moratorium on hydraulic mining, meant that river beds were no longer rising, and in many places channels had significantly deepened. The cut at Horseshoe Bend was a significant element in the project's success. Because it increased the slope of the river, the cut allowed the natural action of the river to clear great volumes of debris, lowering the water levels at Sacramento and farther north on the Feather and Yuba rivers. Throughout the 1920s and into the late 1930s the repair and maintenance of the water craft used in the SRFCP was the main mission performed at the Rio Vista base. In the fiscal year 1938, for example, the COE budgeted $31,903.34 for repairs on the San Joaquin and the Pit (a motor tender).[9]

The SRFCP was modified in 1928 with federal passage of a new flood control act. The 1928 act shifted cost-sharing from 50-50 to one-third federal and two-thirds state/local funding. By this time the COE had significantly deepened the lower channel of the river and widened it to 3100'. The dredgers had also removed Wood Island, a 100-acre island directly opposite Rio Vista, and created Decker Island, which was formed by the cut at Horseshoe Bend. During the 1920s and 1930s the storehouse provided maintenance to a variety of watercraft associated with the SRFCP in addition to the dredges.[10]

9 Letter, from L.H. Rand, Major, Corps of Engineers to Division Engineer, Pacific Division, San Francisco, California, June 8, 1917, RG 77 Records of the U.S. Army Corps of Engineers, Box 3A South Pacific Division General Administration Files, 41B, NARA, San Bruno, California; U.S. Army, 1920, p. 2975; James and Singer, p. 131; Robert Kelley, Battling the Inland Sea: Floods, Public Policy, and the Sacramento Valley, Berkeley: University of California Press, 1989, p.300; Letter from L.B. Chambers, Colonel, Corps of Engineers, to the Division Engineer, South Pacific Division, San Francisco, California, December 9, 1937, RG 77 Records of the U.S. Army Corps of Engineers, Box 3A South Pacific Division General Administration Files, 403, NARA, San Bruno, California.

10 U.S. Army Corps of Engineers, Sacramento District, Post-Flood Assessment for 1983, 1986, 1995, and 1997, Central Valley, California, 2002, p.2-12; JRP Historical Consulting Services, p. 8.



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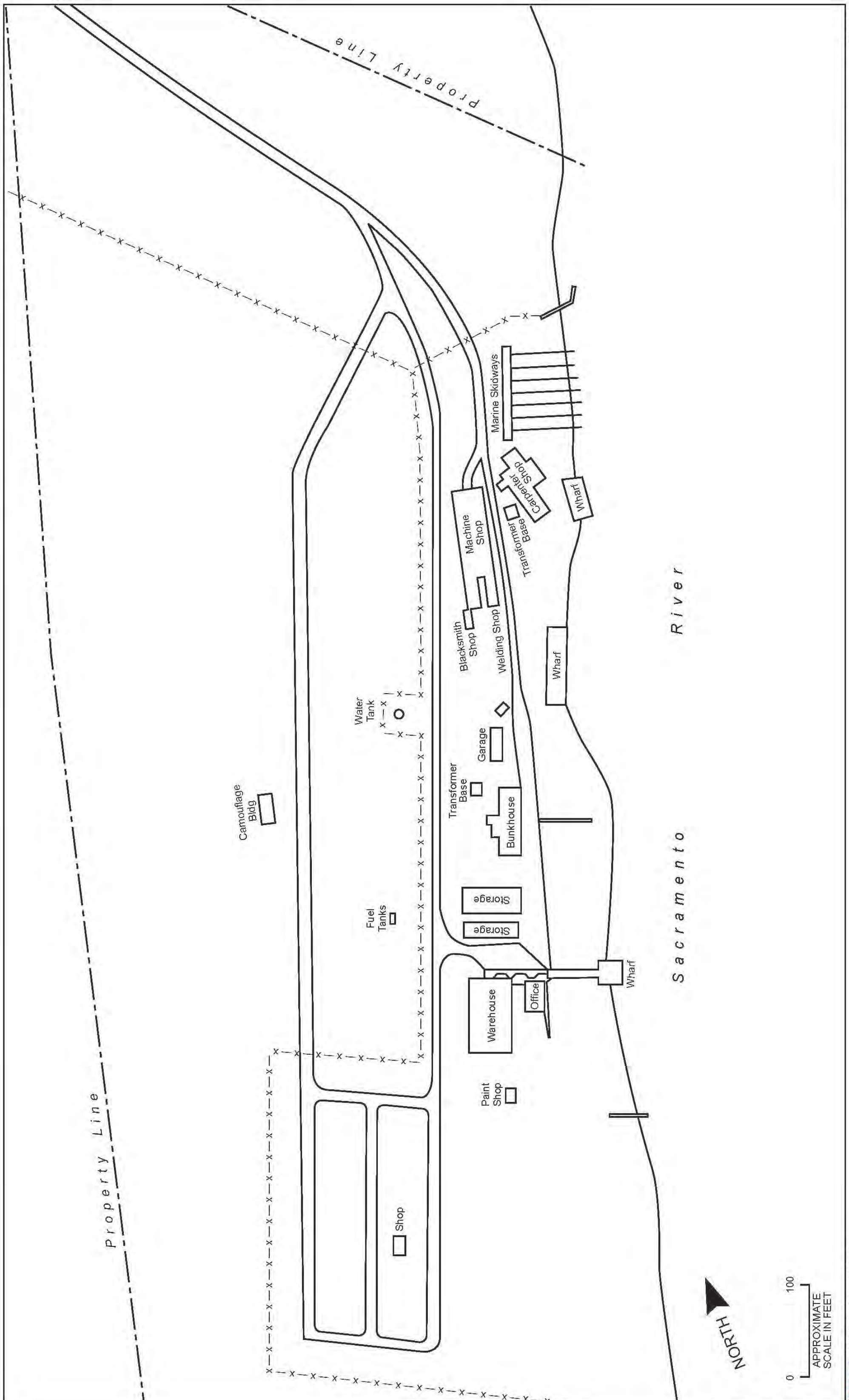
URS DWR Delta Research Station
Rio Vista Army Base

Figure 3
1937 Aerial Image



URS DWR Delta Research Station
Rio Vista Army Base

Figure 4
Rio Vista U.S. Engineer Plant, August, 1942

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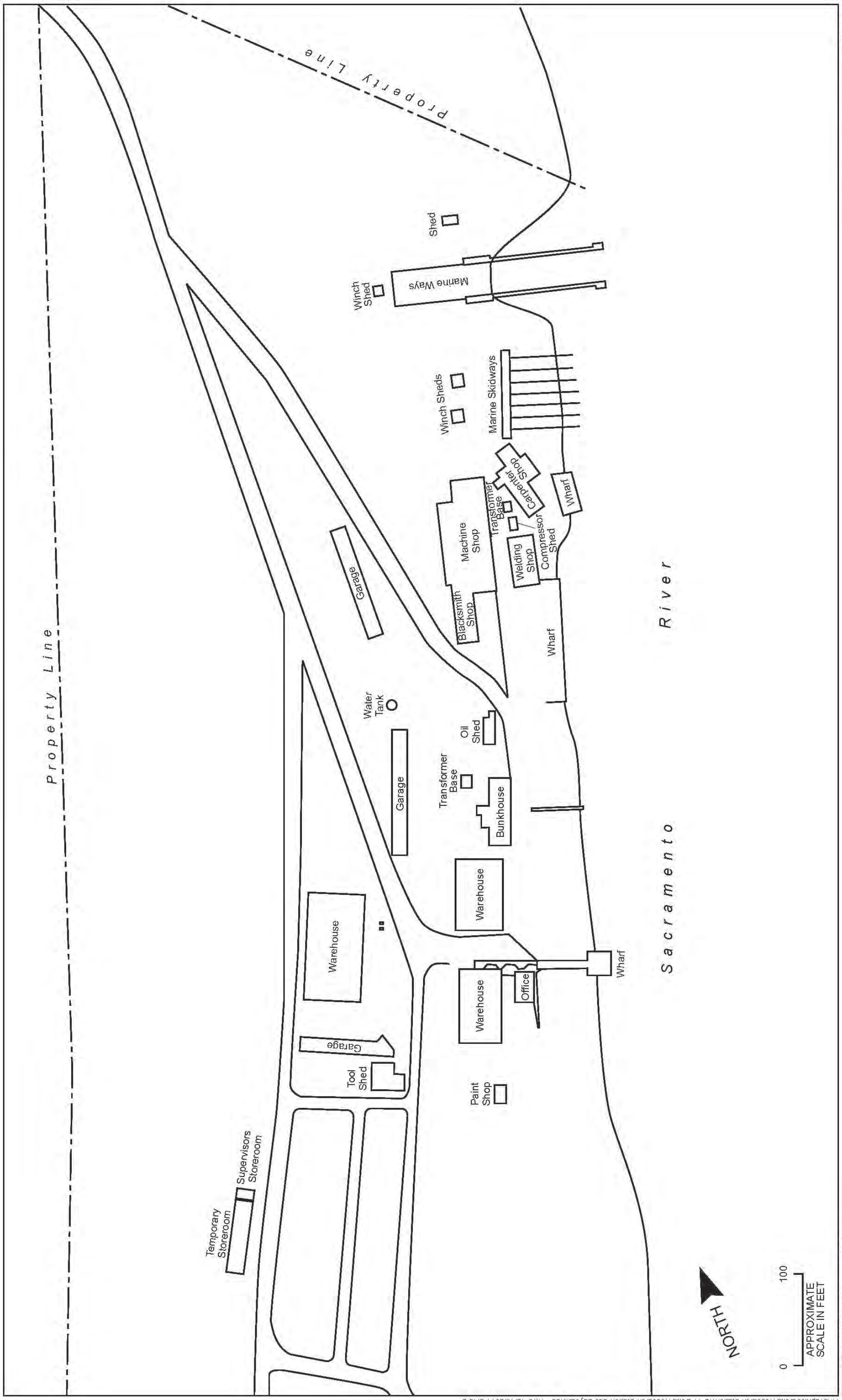

Figure 5
Rio Vista U.S. Engineer Yard, April, 1946

By 1937, the core of the complex along the waterfront comprised at least 13 buildings as well as marine ways to the north and southeast of the Carpenter Shop (Figure 3). In addition, the water tower, two wharves, (including S-103), and a pier, (S-104), had been constructed. The site expanded significantly during late the 1930s through the end of World War II. Between 1937 and 1942, the Carpenter Shop was expanded (Figure 4). The Machine Shop, (T-11) was pieced together during this period from a separate blacksmith shop, welding shop, and machine shop buildings that were located in the vicinity of its current footprint. Aerial photographs from 1937 show three buildings in the vicinity that roughly correspond to the three volumes of the current building in size and form. (Building T-11 has the irregular footprint and combination of roof forms and heights that strongly suggest a building constructed by connecting existing structures.) A 1942 drawing shows three connected buildings which retain their original names and outlines, suggesting they are separate though contiguous buildings. By 1946, it had reached its final form and lacked interior lines of separation on the map (Figure 5). At this point it was named Blacksmith Shop and Machine Shop, and a separate Welding Shop was located nearby.[11]

Although the Flood Control Act of 1941 authorized federal expenditures for the completion of the SRFCP, the outbreak of the war shifted priorities for the COE from civilian infrastructure to military construction. In 1941, the Army Air Corps transferred responsibility for all construction to the COE, and the Army followed suit in 1942. During the first years of the war, the Sacramento District of the COE was building military facilities throughout the west and more than quadrupled in size.

The Sacramento and San Joaquin were used for war effort-related dredging, such as deep water berths at Camp Stoneman, near Pittsburgh, California. The Sacramento was also used for dredging in the Pacific Islands. In 1941, its crew was dredging at Palmyra Island.[12]

Despite the expanded duties, the COE kept up maintenance dredging in the Sacramento River and its tributaries through the war years. Although manifestly less glamorous than the initial stages of the project, continual maintenance was crucial to flood prevention, and far from routine. As author Robert Kelley has pointed out, the hundreds of miles of levees, which consisted only of piles of dirt and sand, required constant repair and monitoring if they were to function. By 1944, the SRFCP was 90% complete. As the war wound down, national priorities shifted to ensuring full employment for returning veterans and revisiting civil works projects that had been tabled by the war. Congress passed a huge new flood control act at the end of 1944 that rivaled the size of Depression-era projects. The act provided not only for the completion of the levees and other works that had been

11 Aerial Photograph, U.S. Department of Agriculture, August 20, 1937; U.S. Army Corps of Engineers, Maps and Plans, 1937 – 1942, on file at City of Rio Vista.

12 U.S. Army Corps of Engineers, 2002, p. 2-12; JRP Historical Consulting Services, p. 9; Letter from J.R.D. Matheson, Colonel, Corps of Engineers to Chief of Engineers, U.S. Army, Washington D.C., August 30, 1941, RG 77 Records of the U.S. Army Corps of Engineers, Box 3A South Pacific Division General Administration Files, 209, NARA, San Bruno, California.

planned before the war, but added huge storage reservoirs to the plan. The entire project was complete by 1968.[13]

Because of the COE's increased responsibilities during the war, and the expansion of the SRFCP after 1944, the Rio Vista base went through its most rapid period of development between 1942 and 1946. In addition to the expansion and structural strengthening of Building T-22 and the expansion of T-11 by piecing together older buildings, several large warehouses, garages, and shop buildings, most of which are extant, were constructed during this period. This was accompanied by construction of 5 small buildings at the northern end of the property, most of which were sheds. In addition, the primary wharf was expanded to its current footprint. The large Marine Ways near the northern end of the property was constructed at this time. A small hothouse associated with the garden near the southern end of the property was also constructed, although it appears to have been demolished shortly after the war.[14]

4.1.4 Rio Vista Transportation Corps Marine Depot

In 1952, the Rio Vista base was transferred to the Army Transportation Corps. The U.S. Engineer Dockyard, Rio Vista, California was re-designated the Rio Vista Transportation Corps Marine Depot, Rio Vista, California. The name change and transfer marked a significant change in use. The Army now used the base to repair, store and preserve harbor craft rather than dredging equipment and river craft. The Army needed a variety of small craft, (which had been in short supply during World War II), to load and unload men and materiel. By the late 1950s, the Rio Vista base employed almost 300 civilians and provided storage for over 350 vessels. This period appears to have been the height of activity for the base. The expansion was large enough to have a noticeable positive effect on Rio Vista's economy.[15]

To accommodate this intensified activity and sharp increase in storage requirements, the Army began to develop new areas of the base. The transfer and change in use ushered in a new period of intensive development, in contrast to the immediate post-war period, when only one new building was constructed. In 1952, the existing roads were paved, and in 1954 the Army added new roads in the western portion of the site. By 1954, it had added a wharf and eight new buildings to the complex, most of which were in the southern and western portions of the site, which had remained undeveloped up to this time. The Army made few floor plan changes to the older buildings in the heart of the complex, but they worked on upgrading sewer, electrical, and performed minor alterations to the buildings through the end of the decade. The exception was the barracks building, which was enlarged with an addition to its current floor plan in 1958. Between 1958 and 1963, the Army added another eight structures including the concrete wharf east of the old Carpenter Shop. Many of the buildings constructed during the Transportation Corps era were small ancillary or

13 Kelley, p. 307; James and Singer, p. 131.

14 Aerial Photograph, U.S. Department of Agriculture, August 20, 1937; U.S. Army Corps of Engineers, Maps and Plans, 1937 – 1946, on file at City of Rio Vista.

15 General Orders No. 97, J. Lawton Collins, Chief of Staff, U.S. Army, Washington, D.C., October 31, 1952; JRP Historical Consulting Services, p. 10-11.

temporary structures. During the later years of the Transportation Corps era, the Army began to lease small areas of the base, including easements to the City of Rio Vista and P.G. & E.[16]

The Transportation Corps utilized the Rio Vista base for roughly a decade. In the early 1960s, after U.S. involvement in the Korean War had ended, activity at the Rio Vista base appears to have been minimal. Although the base was still used by the Army for storage, Army activities were decreasing and the space leased out to other entities increased. In addition to the easements, the U.S. Coast Guard was using the old Office, Carpenter Shop, and Concrete Wharf, while the U.S. Air Force was using some of the warehouse facilities; the Port of Sacramento also had a presence on the base. A private party, named Elmer Wendt, and the Hydraulic Dredging Co. were also lessees. In 1963, the Army transferred a 4-acre parcel at the southeastern end of the base to the U.S. Coast Guard. The Rio Vista Transportation Corps Marine Depot was inactivated around the same time.[17]

4.1.5 Sharpe Army Depot

In December, 1964, the Rio Vista base, which was by this time under the command of the Army Materiel Corps, was activated and re-designated a class II activity of Sharpe Army Depot in Lathrop, California. As U.S. involvement in the Vietnam War gradually increased, the Rio Vista base was transformed once again. Its new mission was preparing, repairing, and restoring amphibious landing craft for use in the Southeast Asian war. In November, 1965, the Army announced its plan to triple the personnel on the base from 50 to 150. Thirty-two vehicles were initially shipped to the base by rail. The vehicles were Lighter Amphibious Resupply Cargo (LARC's), and included LARC 5's, LARC 15's and LARC 60's. In 1967, the Rio Vista base had at least 120 personnel and continued to receive and process new LARC shipments. It was the only Army base that performed this type of duty.[18]

The Army made few changes to the existing buildings during this period, and utilized the open storage areas in the western portion of the base for LARC storage. New construction was limited to small sheds and other ancillary structures. In 1967, the Army planned a large LARC loading ramp at the southeastern edge of the property, along with a large new outdoor storage area for LARC's near the western edge of the property. The new LARC facilities are not extant, and may never have been constructed.[19]

After the Vietnam War began to wind down in the mid-1970s, LARC activities at the base ended. In 1980, the Rio Vista base was transferred to the U.S. Army Reserve. The Army Reserve used the base for weekend training for amphibious assaults and ship maintenance, and deactivated it in 1989. In

16 U.S. Army Corps of Engineers, Maps and Plans, 1942 – 1967.

17 JRP Historical Consulting Services, p. 11; U.S. Army Corps of Engineers, Maps and Plans, 1963 – 1967.

18 General Orders No. 42, Harold K. Johnson, General, United States Army, Chief of Staff, Headquarters, Department of the Army, Washington, D.C., December 18, 1964; The Rio Vista News-Herald & Isleton Journal, "RV Army Base to Triple Force, Increase Role in War Effort, November 3, 1965; U.S. Army Corps of Engineers, Map, 1967.

19 U.S. Army Corps of Engineers, Maps and Plans, 1963.

1995, the Army de-commissioned and abandoned the base, and it has remained vacant and unused since. In 2003, the Army sold the base to the City of Rio Vista for $30,000.[20]

4.2 Use

Between the time it was established in 1913 and its abandonment in 1995, the Rio Vista base stored, maintained, supplied, and repaired water craft for the U.S. Army. The type and purpose of the military craft changed over the years as military needs changed and the base was transferred to various branches of the Army, however, its general purpose remained consistent. For example, Building T-7 was called a Carpenter Shop during the 1940s, and by the late 1950s was referred to as a Ship Repair Shop. Throughout the building's life, however, its use as a shop for the repair of water craft appears to have remained constant despite name changes and branch transfers.

During the Rio Vista base's years of active use its four major periods were:

U.S. Engineers Storehouse, Rio Vista, 1913 – 1951. The U.S. Army COE used the base to support the activities of the California Debris Commission and the SRFCP. Hydraulic dredges, dredge tenders, snagboats, and small river craft that supported dredging and other flood control activities were stored, maintained, supplied, and repaired.

Rio Vista Transportation Corps Marine Depot, 1952 – 1963. The U.S. Army Transportation Corps used the base to store, maintain, supply, and repair small harbor craft used to transport Army personnel and materials.

Sharpe Army Depot, 1964 – c 1974. The U.S. Army used the base to store, maintain, supply, and repair LARC amphibious landing vehicles for use in the Vietnam War.

U.S. Army Reserve Center, c1975 – 1995. The U.S. Army Reserve based the 481st Transportation (Heavy Boat) Company here. The historical record is incomplete for this period, but it is likely the company continued to use the base for storage, maintenance, and repair of water craft.

The known uses of the extant buildings are summarized in the following Table 1.

The uses of buildings documented in 1997 but no longer extant are summarized in Table 2. All were storage or ancillary buildings.

20 City of Rio Vista, "Final Environmental Impact Report, Rio Vista Army Reserve Center Redevelopment Plan," January 2011, DEIR p.6-4.

Table 1. Building Use (Extant Buildings).

Building	Construction*	Modifications/Notes	Use
T-7	1913 – 1919	Small eastern and larger western additions between 1937 - 1942	Carpenter Shop, Ship Repair Shop
T-8	1942 – 1946		Compressor Shed
T-9	1942 – 1946		Welding Shop, Maintenance Shop, Carpenter Shop
T-11	1942 – 1946	3 smaller buildings were in the vicinity of T-11 by 1937. By 1942, the Machine Shop, Welding Shop, and Blacksmith Shop had been connected. By 1946 the building had its current plan.	Machine Shop, Welding Shop, Blacksmith Shop, General Purpose Shop
T-22	1942 – 1946		Garage
T-23	By 1937		Water Tower
T-24	By 1942		Pump House (water tower)
T-25	1923 – 1937		Garage/Oil Shed/Paint Shop
T-26	1923 – 1929	Rear verandah enclosed, small additions to main 2-story building in 1940s, 1-story addition to create current plan, 1958.	Barracks
T-27	1942 – 1946	2 smaller buildings were in this vicinity by 1937.	Warehouse
T-41	1923 – 1929		Office
T-42	1923 – 1929		Warehouse
T-43	By 1937		Paint Shop, Storage
T-46	1942 – 1946	Use appears to have changed from storage to barracks	Tool shed, Barracks
T-50	1942 – 1946	Temporary Storeroom, Rigging Loft	
S-102	1958 – 1960	Concrete Wharf	
S-103	By 1937	Wooden Wharf	
S-104	By 1937	Large Wooden Pier	
S-105	1952 - 1954	Wooden Pier	
Marine Ways	1942 – 1946		

Table 2. Building Use (Demolished)

Building	Construction*	Modifications/Notes	Use	Current Condition
T-1	1942 – 1946	(JRP report lists this building as T-4)	Oakum Shed	Demolished 1997 – 2014
T-2	1942 – 1946		Winch Shed (North Marine Ways)	Demolished 1997 – 2014
T-5	1942 – 1946		Winch Shed (Marine Ways N. of T-7)	Demolished 1997 – 2014
T-6	1942 – 1946		Winch Shed (Marine Ways N. of T-7)	Demolished 1997 – 2014
T-12	1954 – 1958		Storage	Demolished 1997 – 2014
T-20	1942 – 1946		Guard House/Security	Demolished 1997 – 2014
T-29	1952 – 1954		Fire Pump	Demolished 1997 – 2013
T-45	1942 – 1946	North half demolished by 1967	Garage	Demolished by 1997

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5 Current Conditions

The former Rio Vista Army Reserve Center site stretches along the west bank of the Sacramento River for roughly 2,000 feet. It is bounded by a U.S. Coast Guard base to the south, Beach Road on the West, and a private harbor to the north. The site is surrounded by cyclone fence on all sides, and contains 13 buildings and 6 structures, including 2 wharves, 2 piers, a water tower and marine ways (Figure 6). The buildings and structures are clustered along the eastern portion of the property, in the waterfront and marine ways area. The western portion of the property, which is mostly open land and sits atop a small rise, was the open storage area during the property's decades of use. The property has been abandoned for decades, and shows signs of deterioration and vandalism. Paved areas and roads are overgrown with vegetation, vines have engulfed several buildings, and trees have grown through some roofs from the inside. Other characteristics of blight include broken windows, missing doors, holes in walls and roofs, and signs of fires. The level of deterioration varies from building to building, with several buildings that are clearly beyond repair alongside buildings that are appear structurally sound. However, a structural engineer qualified to evaluate historic buildings should assess the extant buildings' reparability prior to the finalization of any proposed plans to repurpose buildings for the DRS.

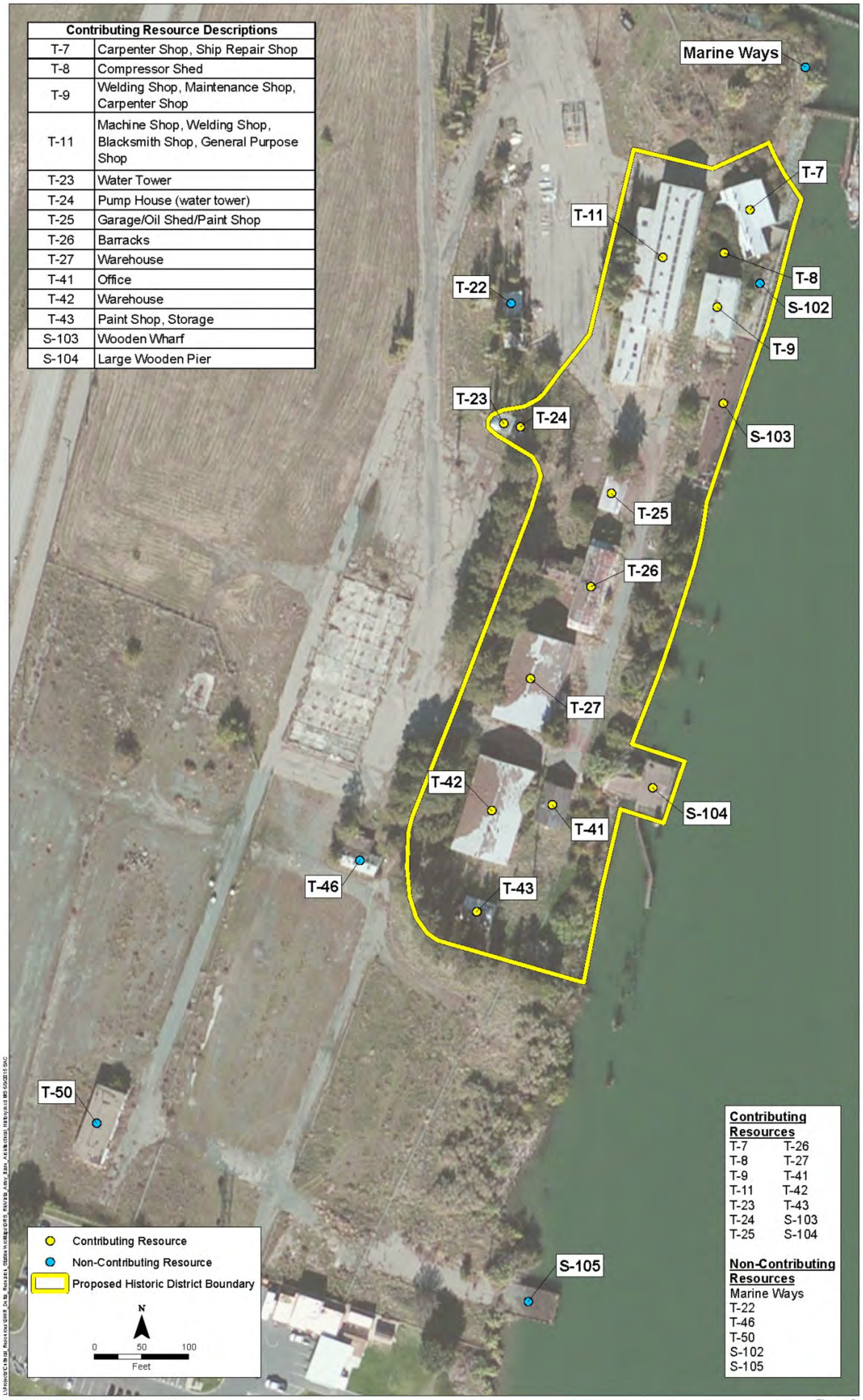
5.1 Waterfront and Marine Ways Area

The waterfront and marine ways area is where a majority of the extant buildings and structures on site are located. It is bounded by a low rise to the south and west, which is topped with mature trees.

5.2 T-7 (1913 – 1919) Carpenter Shop/Ship Repair Shop

The single-story wood frame building is located adjacent to the river at the northern edge of the property's primary cluster of buildings. It consists of a front-gabled primary volume with shed-roofed additions to the east and west that form an irregular plan. The primary roof features industrial vents, minimal eave overhang, and composition sheets. A large, top-mounted sliding door with a personnel door cut into it is centered in the main section of the north elevation. Similar doors in the corrugated metal section on the east have fallen away. Windows are 1-over-1 wood sash, and the foundation is concrete slab. The primary and west sections are clad in asbestos shingles, many of which have fallen off to reveal original wood siding or holes in the building. The east section is clad in corrugated metal.

The Shop Building is the oldest building on the site. It was altered from its original form and plan during the historic period with small additions, between 1942 and 1946. Its core has largely retained its original appearance, however, and it continues to convey its original function. Although in poor repair, it is among the most important buildings on the site. It is severely dilapidated from neglect, vandalism, and remediation activities. The doors and floor have been removed from the eastern section of the building and it is sagging. The main structure shows evidence of deterioration including broken windows/window frames and missing portions of wood siding.



URS DWR Delta Research Station
Rio Vista Army Base

Figure 6
U.S. Engineers Storehouse Historic District

5.3 T-8 (1942 – 1946) Compressor Shed

The small single-story wood frame building is located between T-7 and T-11 near the north end of the primary cluster of buildings. It is rectangular in plan and features a front-gabled roof with moderate eave overhang, exposed rafter tails, and composition shingles. Both gable ends have louvered vents. Its entrance is left of center in its south elevation. Windows on east and west elevations are 6-over-6 wood sash, and the foundation is concrete slab. The building is clad in asbestos shingles, and most window panes are intact.

The building has retained its original form and plan. Original multi-light windows are in better shape than in most other buildings on the property. It is clad in asbestos shingles, which are in relatively good shape, so the condition of the original wood cladding is unknown. Its west elevation is nearly engulfed in blackberry vines, which reach nearly to its eaves. Its inaccessibility due to the overgrown vines may have protected it from vandals.

5.4 T-9 (1942 – 1946) Shop

The large, single-story, double-height, wood frame building is located adjacent to the river south of building T-7. It is rectangular in plan, and has a front-gabled roof with minimal eave overhang and composition shingles. Two large, top-mounted sliding doors on the west elevation have fallen away. Personnel entrances located in the north and south elevations are also missing their doors. Windows, which are arranged in pairs, are 6-over-6 wood sash, and the foundation is concrete slab. Asbestos shingle cladding is missing in many places, revealing original wood siding, and most windows, as well as some window sashes, are broken.

The building has retained its original form and plan. Its massing and construction are similar to T-11, though its footprint is smaller. The building is missing its doors and has been covered in asbestos shingles, many of which have fallen off to reveal original horizontal wood siding, which appears to be in only fair condition. The interior is in excellent condition, with original heavy beams, roof structure, and winch machinery visible.

5.5 T-11 (1942 – 1946) Shop

The large, single-story, double-height, wood frame building is located at the northwestern edge of the primary cluster of buildings. It consists of three rectangular volumes joined to form an irregular plan. The primary volume has a front-gabled roof with industrial vents mounted atop it, minimal eave overhang, and composition shingles. Large, top-mounted sliding doors with personnel doors cut into them are located at the front and rear, (north and south), elevations. Windows are 6-over-6 wood sash. A shed-roofed section is attached to the west side of the main section. A rear wing, which is shorter than the main section, is attached to the west end of its south elevation. A louvered monitor is installed on the ridgeline of its gabled roof. Its south and east elevations have large, top-mounted, sliding doors. All three wings feature reinforced glass skylights and concrete slab foundation. Asbestos shingle cladding has fallen off in places, revealing original wood siding, and most skylights and windows, as well as some window sashes, are broken.

The building has retained its original form and plan. Nearly every window pane is broken, and many muntins and window frames are deteriorated. The large metal sliding door on the north elevation may be a replacement. The building has been covered in asbestos shingles, many of which have fallen off to reveal original horizontal wood siding, which appears to be in good condition. The roof is modern, and appears to be in excellent shape except for a few broken skylights. The interior is in excellent condition, with original heavy beams and roof structure visible. The southwest wing of the building appears to be slightly more deteriorated than the main wing, with boards missing on large sliding doors.

5.6 T-23, B7 1937 (Water Tower)

The tall metal water tower is located to the northwest of Building T-25 atop a small rise. It consists of a cylindrical metal tower with a conical metal roof supported by a metal tower. It has retained its original form and plan and appears to be in excellent condition.

5.7 T-24, 1942 – 1946 (Pump House)

The small wood-frame building, which was constructed as a pump house for the adjacent water tower, is rectangular in plan. It has a barrel roof and a small, top-mounted sliding door on the south elevation. Its single window, on the west elevation, has been boarded up. It is clad in asbestos shingles.

The building has retained its original form and plan. It is in fair condition, with most of its asbestos shingle cladding intact, although its roof trim is deteriorated and wooden door unpainted. T-25, 1923 – 1937 (Storage)

The small wood-frame building is located near the center of the complex. It is rectangular in plan, and has a corrugated metal shed roof. The doors have fallen away from three personnel entrances on the east elevation, while an entrance on the west elevation is fitted with a wood panel door. Windows lack glazing or sashes, and the foundation is concrete slab. It is clad in a combination of corrugated and sheet metal.

It is an undistinguished, utilitarian building that is missing doors and windows..

5.8 T-26, 1923 – 1929 (Barracks, Mess Hall)

The two story, wood-frame building is located between Buildings T-25 and T-27. It consists of a two story main volume joined to a single story wing to form a “T”. Both roofs are gabled with moderate eave overhang and composition shingle. The main entrance is on the north elevation, and is sheltered by a full-width upper verandah topped with a corrugated metal shed roof. The south (rear) elevation features secondary entrances on the first and second floors. An upper verandah has been enclosed on the rear elevation. Windows are 1-over-1 wood sash, and the foundation is concrete slab. Both sections of the building are clad in asbestos shingles, some of which have fallen off to reveal original wood siding. All windows are broken, and many window sashes are falling apart. The roof in the single story wing is severely deteriorated, and many portions are open to the elements.

The building has retained its original form except for a rear verandah enclosure at an unknown date and the addition of the single-story wing in the late 1950s. Most of its double-hung windows are broken, and the frames missing or deteriorated and doors have been removed. The building has been covered in asbestos shingles, some of which have fallen off to reveal original horizontal “drop” wood siding, which appears to be in very good condition. Portions of the corrugated metal roof on the main wing appear to be deteriorated. The roof on the one-story west wing is severely deteriorated. Its materials are not visible, but much of the building is open to the elements.

5.9 T-27, 1942 – 1946 (Warehouse)

The large, two story, wood-frame building is located south of Building T-26. It is rectangular in plan. Its gabled roof has a large industrial vent mounted atop it, moderate eave overhang and composition. Large, top-mounted sliding doors provide access on the north and south elevations, the south door has fallen off. Doors are also missing from three personnel entrances on the east elevation. Windows are 6-over-6 wood sash, and the foundation is concrete slab. All windows are broken, and most sashes have fallen away.

It has retained its original plan and form. Its multi-light windows are severely deteriorated, with few retaining glazing or frames. Sliding vehicle doors have been retained, but personnel doors have been removed. The building is clad in corrugated metal.

5.10 T-41, 1923 – 1929

The single story, wood-frame building is located between Building T-42 and S-104, (a wharf). It is rectangular in plan, and its gabled roof has minimal eave overhang. No entrances are visible due to heavy vegetation that engulfs the building up to the roofline, and windows are 1-over-1 wood sash. The foundation is concrete slab. The south elevation is clad in asbestos shingles, some of which have fallen away to reveal original wood siding. North and east elevations are clad in bare board and batten. The entire west elevation and most of the north elevation are engulfed in vegetation. Windows are broken and/or covered with boards, and most sashes have fallen away.

It has retained its original plan. Its north elevation is unpainted board and batten, but is almost completely engulfed in ivy. Windows are broken or missing, and doors are not visible due to the ivy. The rear (south) elevation is clad in asbestos shingle.

5.11 T-42, 1923 – 1929

The large, two story, wood-frame building is located west of T-41, near the southern end of the primary cluster of buildings. It is rectangular in plan, and its gabled roof has moderate eave overhang and composition. Large, top-mounted sliding doors provide access on the north and south elevations, both doors have large holes in them. Windows are 6-over-6 wood sash and arranged in pairs at the upper gable ends. The side elevations feature 6-over-6 windows arranged singly on the ground floor, with small multi-light fixed windows above. The foundation is concrete slab. Although many windows are broken most wood sashes are in relatively good condition.

It has retained its original plan. Most of its multi-light windows are broken. The north end of the building is clad in board-and-batten, while the rear is metal sheets. Personnel doors are missing, but the north has a large sliding wooden door and the south a large sliding metal door.

5.12 T-43, By 1937

The single story wood-frame building is located at the southern end of the primary cluster of buildings. It is rectangular in plan. Its gabled roof has large industrial vents mounted atop it, minimal eave overhang, and corrugated metal. The entrance, which is on the north elevation, is a large, top-mounted sliding door with a personnel door cut into it. Small nearly square windows are fitted with fixed, multi-light wood sash. The foundation is concrete slab. The entire building is clad in corrugated metal. The gable ends each have two wooden louvered vents near the foundation, as well as several metal louvered vents. Except on the west elevation, windows are broken and sashes are missing.

The building retains its original plan and form. Some multi-light windows are broken, while others are intact. Walls and roof are clad in corrugated metal.

5.13 S-102 c1959 (Concrete Wharf)

S-102 is a large concrete wharf aligned along the riverbank to the north of S-103. It is built of concrete, and features a wood and spring fender along the water's edge. It is heavily overgrown with reeds and other vegetation. It features large marine bollards. It has retained its original design.

5.14 S-103, 1913 – 1936 (Large Wooden Wharf)

S-103 is a large wharf aligned along the riverbank to the east of Building T-9. It is built of heavy wood planks and supported by wood pilings. It features large marine bollards. Several large and small holes have been cut into the plank surface of the wharf, and the pilings that support it are partially burned.

It has retained its original form, however, the supporting structure under the dock has burned. In spite of the fire its heavy construction allows it to retain enough strength to walk on. The dock has also had numerous large holes cut into its surface, apparently cut by the fire department when the understructure was burning.

5.15 S-104, 1929 – 1937 (Large Wooden Pier)

S-104 is a wooden pier that extends into the river northeast of Building T-41. Wooden pilings and what appears to be a wooden walkway extend to the south of the pier. The wharf is inaccessible due to chain link fences and heavily overgrown vegetation, but Google Earth aerial photographs with a 2014 copyright show a footprint identical to the aerial map included in the 1997 report.

5.16 S-105, 1952 – 1954 (Wooden Pier)

This wide wooden pier extends into the river near the southern edge of the property. The heavy boards that comprise its decking are installed diagonally, and it features a large marine bollard at each corner of its eastern end. This pier was not included in the mapped historic area in 1997 and was not evaluated during that project. It has retained its original form.

5.17 Marine Ways, 1942 – 1946

The Marine Ways is located near the northeastern edge of the property. Originally constructed to haul water craft out of the river, the structure consists of a wide wooden ramp that extends from the upper bank into the river. Four parallel metal tracks run along its length, and two wooden piers extend out over the river at either edge of the marine ways. A large metal carriage that was winched down the tracks for operation has been removed since the resource was recorded in 1997, as have its associated oakum shed and winch shed, which were originally located nearby. Although the portions remaining retain their original design, the loss of the carriage that was used for operation represents a substantial loss of integrity.

5.18 Open Storage Area

The open storage area is the mostly clear area east of Beach Drive and atop the low rise that divides the eastern and western portions of the property. It was used primarily for large vehicle storage during the property's historic period. Although it is the site of a handful of buildings constructed during the base's historic period, it is outside the historic heart of the complex where most activity was centered. It also has the foundation of a large warehouse building that has been demolished, and has a stand of mature trees on it.

5.19 T-22, 1942 – 1946 (Garage)

The wood-frame building is rectangular in plan and located to the north of T-23 (the water tower). It has a flat corrugated metal roof and is comprised of three open bays with an enclosed portion at its south end. Cladding on the enclosed portion is corrugated metal, and the foundation is concrete slab. The east elevation features a large, top-mounted sliding door. The building is severely dilapidated and choked with vegetation, including trees growing through its roof.

The building has retained its original form and plan. It is located just north of the water tower, outside the boundary of the proposed historic district. Originally comprised of 16 stalls with an enclosed area at its south end, 12 of the original stalls have been demolished since 1997. It is severely deteriorated.

5.20 T-46, 1942 – 1946 (Storage, Female Barracks)

The single story wood-frame building is located at the southwestern end of the cluster of buildings. It is rectangular in plan. Its gabled roof has minimal eave overhang and composition shingle, although many sections of shingle are missing. No entrances are visible. The foundation is concrete slab. It is clad in asbestos shingles, many of which have fallen off to reveal original wood siding and holes in the building. The entire west elevation and most of the north elevation are engulfed in vegetation. Windows are 1-over-1 wood sash, but all are broken and most sashes have fallen away. The gable ends (east and west elevation) are largely engulfed in vegetation, and a tree is growing through the roof.

The building retains its original form and plan. It just outside the proposed district boundary from the 1997 study. It is severely dilapidated, with missing doors, windows. Asbestos shingles are missing, and reveal holes in the wood siding underneath. There are many holes in its roof, some of which have trees going through them.

5.21 T-50, 1942 – 1946 (Rigging Loft)

The single story wood-frame building is located near the southwest corner of the property. It is rectangular in plan, and its flat roof is and without eave overhang. There are three entrances on the east elevation. The south entrance is large, lacks a door, and has a sign reading “Rigging Loft” above its opening. The center entrance has a large, top-mounted sliding door, and a third at the north end of the elevation is a personnel door. Window openings are irregular, and lack glazing and sashes. The foundation is concrete slab. A small addition with a low shed roof projects from the north elevation of the building. The building is clad in asbestos shingles, many of which have fallen away to reveal original wood siding.

The building has retained its original form and plan. It is outside the waterfront area mapped in the 1997 report, and was not evaluated during that project. It dates from the historic period, but is a utilitarian building and located outside the historic core of the complex. It is dilapidated, with doors, windows, and some asbestos shingles missing.

6 Evaluation

6.1 Evaluation

This study has been undertaken in order to determine the property's eligibility for the CRHR. In 1997, consultant JRP Historical evaluated the base, which was at that time still owned by the U.S. Army, and determined that it appeared eligible for the NRHP. The Army, however, did not agree with this assessment, primarily because they believed that there was "no convincing argument for a high level of integrity." California's SHPO concurred with the Army, and the property was never determined eligible for or listed on the NRHP or other historic register. Therefore, this study will not revisit the question of NRHP eligibility. As the result of the present evaluation, and as discussed below, the U.S. Engineers Storehouse Historic District appears to retain sufficient integrity of design, setting, location, association, feeling, workmanship to justify eligibility under Criterion 1 of the CRHR, for its association with historic flood control activities in the Central Valley.[21]

Because the City of Rio Vista does not have an official process for listing historic resources, this study has not evaluated the complex for local eligibility. However, Section 5C of Rio Vista's most recent General Plan calls for preservation of local historic places, and earlier documents prepared by the City for the redevelopment of the property suggest that the U.S. Engineers Storehouse is considered a local historic place.[22]

6.2 California State Regulations

The CRHR is a comprehensive listing of historic resources in California. Administered by the State Historical Resources Commission, it lists buildings, sites, structures, objects, and historic districts that have been found historically significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California (California Environmental Quality Act Guidelines 15064.5(a)(3)). Typically, buildings are considered eligible for the CRHR if they are over 50 years old and meet four criteria for significance (1-4), which are listed below. A resource's eligibility for CRHR rests on meeting the following significance criteria listed under California Code of Regulations (CCR) 4852(b):

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[21] Letter, from Paul R. McGuff, Installation Cultural Resource Management Officer, Department of the Army, Fort Lewis, Washington, April 14, 1997.

22 The Draft Environmental Impact Report Rio Vista Army Reserve Center Redevelopment Plan notes that the Army Base "appears to be eligible for listing in the California Register of Historical Resources (City of Rio Vista 2010:2-7)", and the Army Base District Design Guidelines state that "the unique riverfront complex of warehouses, shops and wharves conveys a strong sense of time and place, and of Rio Vista's river and Delta heritage (MIG 2011:12)." These statements indicate that the City of Rio Vista considers the Army base to have local historical significance. It should be noted, however, that the Army Base has not previously be evaluated for the CRHR, as suggested by the language in the Draft Environmental Impact Report cited above. This was confirmed in a telephone conversation with Mr. Jay Correia, Supervisor of the Office of Historic Preservation Registration Unit, on December 1, 2014 (Offermann, personal communication December 1, 2014).

1. It is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; or
2. It is associated with the lives of persons important to local, California, or national history; or
3. It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master, or possesses high artistic values, or
4. It has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California, or the nation.

In addition to age eligibility and significance, eligibility rests on integrity, which affects a property's ability to convey the qualities that make it significant. Pursuant to CCR 4852 (c), seven types of integrity are considered: location, design, setting, materials, workmanship, feeling, and association. According to CCR 4852 (c), a historical resource "must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significances...Alterations over time to a resource or historic changes in their use may themselves have historical, cultural, or architectural significance. It is possible that historical resources may not retain sufficient integrity to meet the criteria for listing in the National Register, but they may still be eligible for listing in the California Register."[23]

Historic Districts are defined by CCR 4852 (a) as "unified geographic entities which contain a concentration of historic buildings, structures, objects, or sites united historically, culturally, or architecturally." The U.S.Engineers Storehouse site is unified geographically and the core of the property along the waterfront contains a concentration of historic buildings and structures. Therefore, the buildings and structures at the core of the complex are appear to be collectively eligible to the CRHR as a historic district.[24]

6.3 Significance

The Rio Vista base is significant for its association with the California Debris Commission and the SRFCP. The SRFCP is one of the most important public works ever undertaken in California. Over its half-century lifespan, the project was able to substantially mitigate flood danger in the Sacramento and San Joaquin river systems, breaking the Central Valley's devastating pattern of floods that had resulted in loss of life and property through the nineteenth and early twentieth century. The project was therefore an important factor that allowed the Central Valley both to develop widespread intensive agriculture and to ultimately become home to millions of Californians. The SRFCP protects 900,000 acres of agricultural land and 100,000 acres of developed urban land from flooding.[25]

23 California Code of Regulations, Title 14, Division 3, Chapter 11.5, 4852 (b) and (c).

24California Code of Regulations, Title 14, Division 3, Chapter 11.5, 4852 (a).

25 Kelley, p. 306, 309 – 310.

In addition to its role in increasing agricultural and population growth in the Central Valley, the SRFCP was groundbreaking in other respects. Prior to this time, flood control efforts nationwide tended to lack coordination and to rely on the construction of high levees in order to keep rivers within their channels. The SRFCP was a visionary plan that engineered flood control for an entire river system through the coordinated implementation of weirs, bypasses, dredging, and levee building. It included 980 miles of levees, 7 weirs or control structures, and 95 miles of bypasses. Federal funds were first used for flood control on the Sacramento and Mississippi rivers. After a catastrophic flood on the Mississippi River in 1927, the COE altered the national “levees only” flood control standard to an integrated system based on the technology developed for the Sacramento River.[26]

The Rio Vista base is directly associated with the execution of this trailblazing project. The dredges and other water craft used throughout the river system were dispatched, stored, maintained, and repaired at the complex. The equipment and personnel associated with the base were involved in all aspects of the work, including dredging and levee construction. The bypass at Horseshoe Bend near Collinsville, which was undertaken to increase the capacity of the lower Sacramento’s channel, was a massive project in its own right. Known as “uncorking” the river’s mouth, it was a particularly important aspect of the SRFCP that helped prevent flooding as far up the river system as Sacramento. The Rio Vista base’s location was chosen because it was centrally located from other project locations, while being adjacent to this crucial element of the project. The period of significance for the Rio Vista base is between 1919 and 1951. 1919 is the earliest year to which an extant building on the site can be dated (although T-7 is likely the original storehouse that was constructed on the wharf in 1913). 1951 is the last year the COE occupied the complex before turning the base over to the Army Transportation Corps in 1952. Although the bulk of the SRFCP as originally designed was complete by 1944, the Flood Control Act of 1944 not only provided for the completion of previously designed levees, it added large elements such as storage reservoirs to the project. The rapid pace of development on the base at the time this large new federal flood control measure was enacted strongly suggests that the SRFCP active through the 1940s, contrary to the assertions of previous reports.[27]

The U.S. Engineers Storehouse Historic District is directly associated with the SRFCP, and therefore appears eligible to the CRHR as a historic district under Criterion 1, for its association with events that have made a significant contribution to the broad pattern of our history. The U.S. Engineers Storehouse played a crucial role in a project that enabled both the residential and the agricultural development of the Central Valley.

26 Kelley, p. 308 – 309.

27James and Singer, p. 131.

The U.S. Engineers Storehouse is not eligible under Criteria 2 or 3. It has no known associations with any persons significant to our past, and its architecture does not represent the work of a master, nor does it possess high artistic values.

The U.S. Engineers Storehouse has been otherwise documented and does not appear to be eligible under Criterion 4.

Although the Rio Vista base supported Korean and Vietnam War activities under the aegis of the U.S. Army Transportation Corps and Sharpe Army Depot, there is no indication that the contributions made by the base were particularly significant. In addition, none of the substantial extant buildings located in the historic core of the base were constructed during these eras.

6.4 Integrity

The waterfront area is the historic heart of the base, and the extant structures within the area possess a high degree of integrity. The bulk of the buildings possess integrity of location, design, setting, workmanship, feeling, and association. The blight and deterioration of the site have caused some loss of materials integrity, as some buildings, for example, are missing most doors and windows. In addition, most of the buildings on the base were clad in asbestos shingles circa 1958, resulting in a partial loss of integrity. Many of the asbestos shingles have subsequently deteriorated and fallen away, however, in many cases revealing intact, original wood siding underneath. Therefore, the shingles are considered reversible, and have not resulted in a substantial loss of integrity for the buildings. Despite the deterioration of most of the buildings in the complex, as a group clustered along the waterfront they continue to convey a clear sense of the original purpose of the base. For example, Building T-26 clearly communicates is original function as a bunkhouse and barracks. The large industrial buildings like T-11 and T-9 also communicate their original function as shipbuilding and repair facilities.

Although seven buildings have been demolished, collapsed, or burned since 1997, only one of these buildings was within the boundaries of the historic district. In addition, all were sheds, pump houses, or other ancillary buildings, and most were quite small. None of the large buildings that are significantly associated with the historic uses of the property have been demolished.

One exception to the overall high integrity of the buildings at the complex is the Marine Ways. The original carriage apparatus has been removed, resulting in a substantial loss of integrity for the Marine Ways. For this reason, the boundaries of the potential U.S. Engineers Storehouse Historic District have been drawn to exclude the Marine Ways.

The boundaries of the U.S. Engineers Storehouse Historic District encompass the cluster of extant buildings that comprise the historic heart of the complex. The boundaries have been drawn to include a high concentration of contributing resources from the period of significance, 1913 – 1946. Their rough outlines are as follows: Building T-11 on the north, the general small ridge that divides the property on the west, Building T-43 on the south, and the river on the east. Contributing and non-contributing resources within U.S. Engineers Storehouse Historic District boundaries are summarized in Table 3.

Table 3. Resources within the Potential Historic District Boundaries.

Building	Construction	Use	Status
T-7	1913 – 1919	Carpenter Shop, Ship Repair Shop	Contributor
T-8	1942 – 1946	Compressor Shed	Contributor
T-9	1942 – 1946	Welding Shop, Maintenance Shop, Carpenter Shop	Contributor
T-11	1942 – 1946	Machine Shop, Welding Shop, Blacksmith Shop, General Purpose Shop	Contributor
T-23	By 1937	Water Tower	Contributor
T-24	By 1942	Pump House (water tower)	Contributor
T-25	1923 – 1937	Garage/Oil Shed/Paint Shop	Contributor
T-26	1923 – 1929	Barracks	Contributor
T-27	1942 – 1946	Warehouse	Contributor
T-41	1923 – 1929	Office	Contributor
T-42	1923 – 1929	Warehouse	Contributor
T-43	By 1937	Paint Shop, Storage	Contributor
S-102	1958 – 1960	Concrete Wharf	Non-contributor (outside period of significance)
S-103	By 1937	Wooden Wharf	Contributor
S-104	By 1937	Large Wooden Pier	Contributor

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7 References

7.1 Books

Kelley, Robert. Battling the Inland Sea: Floods, Public Policy, and the Sacramento Valley. Berkeley: University of California Press, 1989.

7.2 Articles and Reports

James, L. Allan and Michael B. Singer. “Development of the Lower Sacramento River Flood-Control System: Historical Perspective.” Natural Hazards Review, Vol. 9, No. 3, American Society of Civil Engineers, August 1, 2008.

JRP Historical Consulting Services. Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, Solano County, California, Draft. February, 1997.

Hagwood, Joseph J. The California Debris Commission U.S. Army Corps of Engineers, Sacramento District, 1981.

U.S. Army Corps of Engineers. Report of the Chief of Engineers, U.S. Army, Part 1. Washington, D.C.: Government Printing Office, 1910.

_____Report of the Chief of Engineers, U.S. Army, Part 1. Washington, D.C.: Government Printing Office, 1913.

_____Report of the Chief of Engineers, U.S. Army, Part 2. Washington, D.C.: Government Printing Office, 1920.

U.S. Army Corps of Engineers, Sacramento District. Post-Flood Assessment for 1983, 1986, 1995, and 1997, Central Valley, California. U.S. Army Corps of Engineers, 2002.

7.3 Government Documents

U.S. Army. General Orders No. 97. J. Lawton Collins, Chief of Staff, U.S. Army, Washington, D.C., October 31, 1952.

_____General Orders No. 42. Harold K. Johnson, General, United States Army, Chief of Staff, Headquarters, Department of the Army, Washington, D.C., December 18, 1964.

7.4 Archives and Manuscript Collections

RG 77, Records of the U.S. Army Corps of Engineers, NARA, San Bruno, California. Letter, from L.H. Rand, Major, Corps of Engineers to Division Engineer, Pacific Division, San Francisco, California, June 8, 1917, Box 3A, South Pacific Division General Administration Files, 41B.

RG 77, Records of the U.S. Army Corps of Engineers, NARA, San Bruno, California. Letter from L.B. Chambers, Colonel, Corps of Engineers, to the Division Engineer, South Pacific Division, San Francisco, California, December 9, 1937, Box 3A South Pacific Division General Administration Files, 403.

RG 77, Records of the U.S. Army Corps of Engineers, NARA, San Bruno, California. Letter from J.R.D. Matheson, Colonel, Corps of Engineers to Chief of Engineers, U.S. Army, Washington D.C., August 30, 1941, Box 3A South Pacific Division General Administration Files, 209.

7.5 Maps and Aerial Photographs

Aerial Photograph, ABO-53-75, flown on August 20, 1937. On file at the Solano County Archives.

U.S. Army Corps of Engineers. Proposed Marine Way, U.S. Engineer Depot, Rio Vista, California, Sacramento: U.S. Army Corps of Engineers, Sacramento District, 1937. On file at the City of Rio Vista.

_____Machine Shop Extension at U.S. Engineer's Plant – Rio Vista, California. Sacramento: U.S. Army Corps of Engineers, Sacramento District, 1942. On file at the City of Rio Vista.

_____Sacramento River California, U.S. Engineer Plant, Rio Vista, California. Sacramento: U.S. Army Corps of Engineers, Sacramento District, August, 1942. On file at the City of Rio Vista.

_____Revised Column Construction, Welding Shop & Machine Shop, U.S.E.D. Yards & Shops, Rio Vista, California. Sacramento: U.S. Army Corps of Engineers, Sacramento District, June 15, 1944. On file at the City of Rio Vista.

_____Rehabilitation of Main Wharf, U.S.E.D. Yards & Shops, Rio Vista, California. Sacramento: U.S. Army Corps of Engineers, Sacramento District, 1944. On file at the City of Rio Vista.

_____Rehabilitation of Main Wharf, U.S.E.D. Yards & Shops, Rio Vista, California. Sacramento: U.S. Army Corps of Engineers, Sacramento District, 1944. On file at the City of Rio Vista.

U.S. Army. Electric Repair Work, Rio Vista Marine Storage Activity, Rio Vista, California, U.S. Engineer Yard, Rio Vista, California. San Francisco: U.S. Army, San Francisco District, April, 15 1954. On file at the City of Rio Vista.

_____Additional Roads, Rio Vista Storage Activity. U.S. Army, January 12, 1956. Plant Engineer's Office. O.A.T. Fort Mason.

_____Topographic Map, Rio Vista Marine Storage Activity, California. U.S. Army, San Francisco Port of Embarkation, January 1, 1958. On file at the City of Rio Vista.

_____Real Estate, Rio Vista Storage Activity, California. U.S. Army, San Francisco Port of Embarkation, January 1, 1958. On file at the City of Rio Vista.

_____Rio Vista LARC Support Facility. Sharpe Army Depot, Office of the Post Engineer, October 6, 1967, Lathrop, California.

USGS. Rio Vista. 7.5 minute quadrangle, 1910.

7.6 Newspapers

Rio Vista News-Herald & Isleton Journal.

San Francisco Call.

7.7 Personal Communication

Correia, Jay. Jay Correia, Supervisor of the California Office of Historic Preservation Registration Unit, telephone conversation with Janis Offermann, URS Cultural Resources Specialist on December 1, 2014 regarding previous CRHR evaluation of the Rio Vista Army Base.

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Appendix A
DPR 523 D and Primary Forms

DISTRICT RECORD

Trinomial

***NRHP Status Code:** 3CD

***Resource Name or #** (Assigned by recorder)**:** U.S. Engineers Storehouse Historic District

D1. Historic Name: U.S. Engineers Storehouse D2. Common Name: Rio Vista Army Reserve Center

***D3. Detailed Description** (Discuss overall coherence of the district, its setting, visual characteristics, and minor features. List all elements of district.):

The U.S. Engineers Storehouse Historic District is located within the former U.S. Army Corps of Engineers/Army Reserve Center south of the town of Rio Vista between Beach Road and the Sacramento River. The property stretches along the river for roughly 2,000 feet, and is bounded by the Delta Marina Yacht Harbor on the north and the U.S. Coast Guard Station to the south. The site is surrounded by cyclone fence on all sides, and contains 13 buildings and 6 structures, including 2 wharves, 2 piers, a water tower and marine ways. The buildings and structures are clustered along the eastern portion of the property, in the Waterfront and Marine Ways area. The western portion of the property, which is mostly open land and sits atop a small rise, was the Open Storage area during the property's decades of use. The U.S. Engineers Storehouse Historic District is a relatively compact area along the waterfront where most of the buildings and structures on the site are clustered (continued, p. 2).

***D4. Boundary Description** (Describe limits of district and attach map showing boundary and district Thelements.):

The boundaries of the U.S. Engineers Storehouse Historic District encompass the cluster of extant buildings that comprise the historic heart of the complex along the waterfront. Their rough outlines are as follows: Building T-11 on the north, the general small ridge that divides the property on the west, Building T-43 on the south, and the river on the east.

***D5. Boundary Justification:**

The boundaries have been drawn to include a high concentration of contributing resources from the period of significance, 1913 – 1946. Although the boundaries of the base itself are much larger, most of the area was used for open storage or other ancillary activities during the period of significance. The important extant buildings and structures that have retained sufficient integrity to convey their significance are all found within the district boundaries.

***D6. Significance: Theme:** Flood Control & River Transportation **Area:** Rio Vista Army Reserve Center

Period of Significance: 1913 – 1946 **Applicable Criteria:** California Register of Historical Resources, Criterion 1

(Discuss district's importance in terms of its historical context as defined by theme, period of significance, and geographic scope. Also address the integrity of the district as a whole.)

<u>Summary of Significance</u>
The U.S. Engineers Storehouse Historic District is eligible for listing on the CRHR under Criterion 1, for its association with historic flood control activities in the Central Valley. The Rio Vista Army Reserve Center is associated with the California Debris Commission and the Sacramento River Flood Control Project. The SRFCP is one of the most important public works ever undertaken in California. Over its half-century lifespan, the project was able to substantially mitigate flood danger in the Sacramento and San Joaquin river systems, breaking the Central Valley's devastating pattern of floods that had resulted in loss of life and property through the nineteenth and early twentieth century. The project was therefore an important factor that allowed the Central Valley both to develop widespread intensive agriculture and to house millions of Californians.

In addition to its role in increasing agricultural and population growth in the Central Valley, the SRFCP was groundbreaking in other respects. Prior to this time, flood control efforts nationwide tended to lack coordination and to rely on the construction of high levees in order to keep rivers within their channels. The SRFCP was a visionary plan that engineered flood control for an entire river system through the coordinated implementation of weirs, bypasses, dredging, and levee building. It was also groundbreaking in that it was the first time federal funds were used for large-scale flood control. It was used as a template for later flood control projects on the Mississippi River as well as other American rivers.

The Rio Vista base is directly associated with the execution of this trailblazing project.The dredges and other water craft used throughout the river system were dispatched, stored, maintained, and repaired at the complex. The equipment and personnel associated with the bases were involved in all aspects of the work, including dredging and levee construction (continued p. 3).

***D7. References** (Give full citations including the names and addresses of any informants, where possible.):

(See footnotes)

***D8. Evaluator:** Kara Brunzell **Date:** 29 October 2014

Affiliation and Address: Brunzell Historical
1613 B Street, Napa, CA 94559

***Resource Name or #** (Assigned by recorder) U.S. Engineers Storehouse Historic District

***Recorded by:** Kara Brunzell ***Date:** 29 Oct 2014 ☒ Continuation ☐ Update

***D3. Detailed Description** (continued)

The U.S. Engineers Storehouse Historic District is characterized by early twentieth century industrial buildings that were originally constructed by the U.S. Army Corps of Engineers (COE). These include large buildings designed for ship repair and storage, as well as sheds to house pumps and small equipment, and support buildings such as barracks and offices. The buildings all feature gabled roofs, multi-light wood sash windows, and lack ornamentation. Most are clad in asbestos shingles over horizontal wood siding, although a few have corrugated or sheet metal siding. The large storage and shop buildings all feature large top-mounted sliding doors and heavy interior beam construction. The smaller buildings have swinging personnel doors. The district also features structures such as a water tower and wharves.

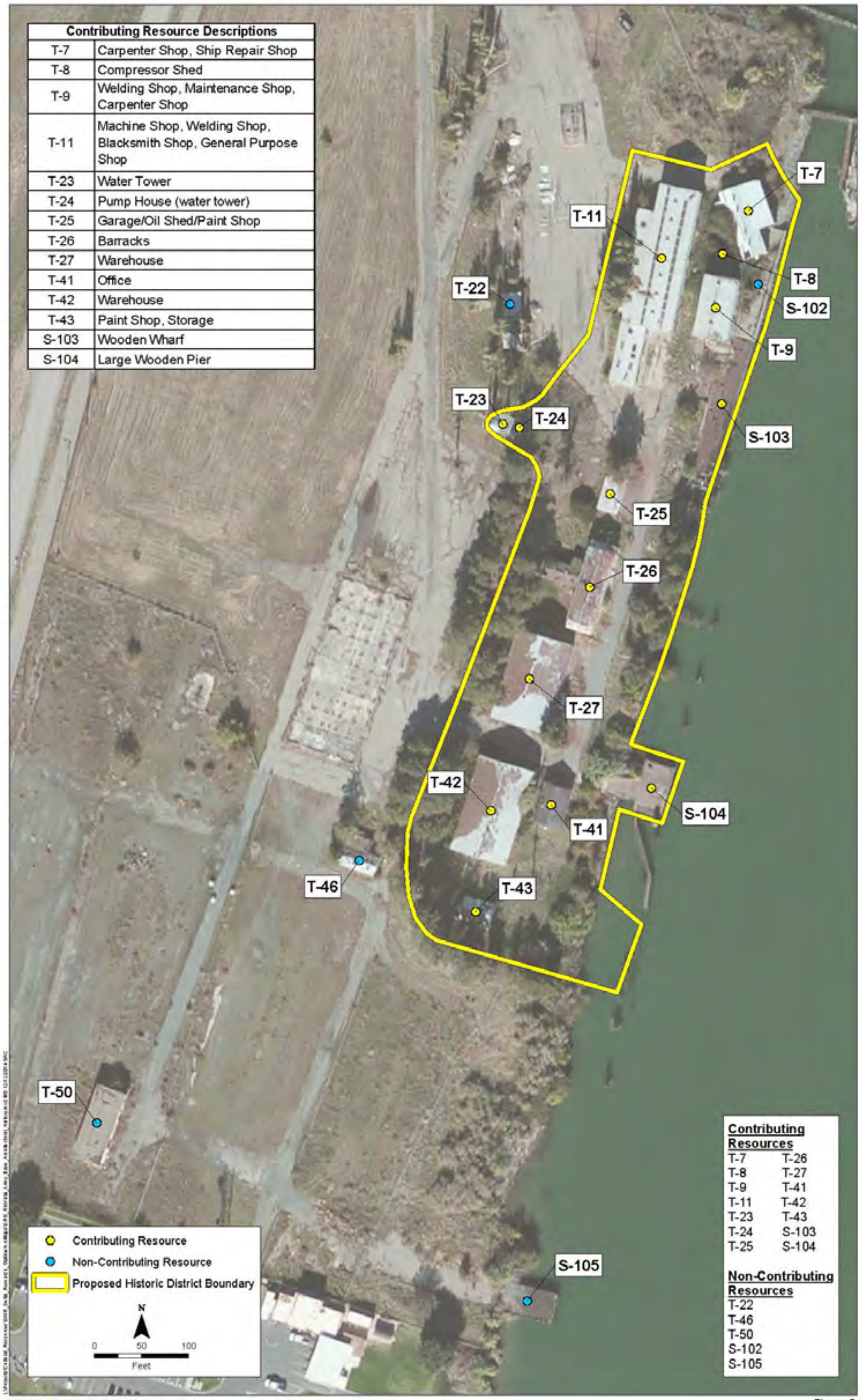
The property has been abandoned for decades, and shows signs of deterioration and vandalism. Paved areas and roads are overgrown with vegetation, vines have engulfed several buildings, and trees have grown through some roofs from the inside. Other characteristics of blight include broken windows, missing doors, holes in walls and roofs, and signs of fires. The level of deterioration varies from building to building, with several buildings that are clearly beyond repair alongside buildings that are appear structurally sound. Aside from the blight and dilapidation, most of the extant structures are remarkably unaltered from the historic period, except for the asbestos siding that was installed in the late 1950s.

The table below lists the resources within the district by building number, approximate construction date, historic use, and CHRSC Code. Most buildings and structures have been assigned a CHRSC Code of "3CD", which indicates eligibility in a potential state historic district. Non-contributors have been assigned a CHRSC of "6Z", indicating that they are ineligible for either individual or district listing.

Building #	Construction	Use	CHRSC Code
T-7	1913 – 1919	Carpenter Shop, Ship Repair Shop	3CD
T-8	1942 – 1946	Compressor Shed	3CD
T-9	1942 – 1946	Welding Shop, Maintenance Shop, Carpenter Shop	3CD
T-11	1942 – 1946	Machine Shop, Welding Shop, Blacksmith Shop, General Purpose Shop	3CD
T-23	By 1937	Water Tower	3CD
T-24	By 1942	Pump House (water tower)	3CD
T-25	1923 – 1937	Garage/Oil Shed/Paint Shop	3CD
T-26	1923 – 1929	Barracks	3CD
T-27	1942 – 1946	Warehouse	3CD
T-41	1923 – 1929	Office	3CD
T-42	1923 – 1929	Warehouse	3CD
T-43	By 1937	Paint Shop, Storage	3CD
S-102	1958 – 1960	Concrete Wharf	6Z
S-103	By 1937	Wooden Wharf	3CD
S-104	By 1937	Large Wooden Pier	3CD

***Resource Name or #** (Assigned by recorder) U.S. Engineers Storehouse Historic District

***Recorded by:** Kara Brunzell ***Date:** 29 Oct 2014 ☒ Continuation ☐ Update



URS DWR Delta Research Station
Rio Vista Army Base

Figure 6
U.S. Engineers Storehouse Historic District

***D6. Significance** (continued)

Theme: Flood Control & River Transportation

The bypass at Horseshoe Bend near Collinsville, which was undertaken to increase the capacity of the lower Sacramento's channel, was a massive project in its own right. Known as "uncorking" the river's mouth, it was a particularly important aspect of the SRFCP that helped prevent flooding as far up the river system as Sacramento. The Rio Vista base's location was chosen because it was centrally located from other project locations, while being adjacent to Horseshoe Bend. The period of significance for the Rio Vista base is between 1913, when the COE broke ground on its first wharf and storehouse, and 1946, which marks the end of the second period of intensive expansion of the complex under the COE.

California Debris Commission and Sacramento River Flood Control

Large numbers of Americans began settling in California's Central Valley during and after the Gold Rush, at first to mine gold and then to farm the fertile valley floor. They immediately discovered that the low-lying areas were extremely vulnerable to flooding. The highly variable volume of flow and the relatively narrow channel of the Sacramento River were natural conditions that resulted in regular flooding of large portions of the valley floor near rivers and tributaries. Although early maps of the area showed large expanses of marshland, (indicating that settlers were aware of these conditions), they nevertheless settled in these vulnerable areas in large numbers.[1]

Hydraulic mining, the practice of using giant water hoses to wash away hillsides and expose valuable minerals, was practiced in California's Gold Country by the 1850s. Use of the technology increased dramatically in the 1860s and 1870s, and enormous volumes of tailings washed into the Sacramento and San Joaquin Rivers and their tributaries. The addition of huge amounts of debris to the river system exacerbated the naturally occurring propensity for flooding in the Central Valley, resulting in repeated disastrous inundation and damage to farmland and property. Individual land owners and levee districts began constructing levees to protect localities. These piecemeal local projects led to "levee wars" in the 1860s and 1870s, an unstable situation in which levees protecting certain locales forced water back into the main channel and worsened overall flooding. In 1884, Judge Lorenzo Sawyer effectively ended hydraulic mining in California in a landmark decision that prohibited the discharge of debris into the state's waterways. The problems caused by the debris, however, remained. In 1893, the federal Caminetti Act allowed the resumption of hydraulic mining, but created the California Debris Commission (CDC) to regulate it. U.S. President Grover Cleveland appointed three officers of the Army Corps of Engineers (COE) to the CDC. In addition to flood protection, the government charged the commission with improving navigation in California's Rivers for the benefit of commerce, and the body was given the power to build levees, dams, and other works. The CDC's power, which included authority over private hydraulic mining operations, was virtually unprecedented.[2]

Sacramento River

Even before the formation of the CDC, the COE was involved in improving navigation on the Sacramento and San Joaquin Rivers. Activities included survey, snag removal, wing-dam construction, and some dredging. The individual projects, however, were limited in scope. In 1899, a larger, coordinated project was funded that aimed to improve navigation in the Sacramento River all the way from Red Bluff, (the effective head of navigation), to the mouth of the river. In addition to limited funding, the CDC in its early years lacked the vision required to effectively control flooding throughout the system. Like the public, the COE had long been biased in favor of a single channel approach that relied on high levees for flood protection. After repeated levee failures, however, public opinion began to shift. In 1894, the Manson-Grunsky Report presented a detailed comprehensive plan based on data collected over a period of decades. The plan proposed a system of bypasses and control weirs to move water out of the main river channel during floods while protecting most farmland. Levees remained an important component of the plan, but it would allow for the control of larger flood volumes than the old levee-only system could handle. By 1907, the CDC had completed extensive surveys of the waterways, and finally realized that the system needed a comprehensive plan for flood control, navigation, and debris management. The CDC put forth the "Jackson Report," (named for commission member Thomas H. Jackson), in 1910. The approach outlined in the report included river bank levees construction, bypass construction, weirs to route flood waters from river to bypasses, and the enlargement of the channel by dredging between Cache Slough and Suisun Bay. The

[1] L. Allan James and Michael B. Singer, "Development of the Lower Sacramento River Flood-Control System: Historical Perspective," *Natural Hazards Review, Vol. 9, No. 3,* American Society of Civil Engineers, August 1, 2008, p. 125 – 126.
[2] Joseph J. Hagwood, *The California Debris Commission,* U.S. Army Corps of Engineers, Sacramento District, 1981, p. 26; James and Singer, p. 127, 130; Hagwood, p. 31.

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major elements of the Jackson Report were identical to the suggestions put forward by the Manson-Grunsky Report over 15 years before.[3]

The San Joaquin and Sacramento River system was essential transportation infrastructure at the turn of the twentieth century, making the project one of vital economic importance. In 1910, the system of waterways was carrying $60,000,000 worth of freight and 300,000 passengers annually. Many farms located near the river system had no railroad access and relied solely on the waterways for shipping agricultural produce. Local boosters were well aware of the value of navigable rivers as well as the dangers of flooding, and in 1909, several hundred Sacramento Delta property owners met in Rio Vista and formed the San Joaquin and Sacramento River Improvement Association. More than an advocacy organization, the group complemented government efforts to improve the system by raising money to acquire the rights of way between Rio Vista and Collinsville, (which were necessary for the widening of the lower channel, popularly known as "uncorking" the river). In 1910, Congress passed a River and Harbor Act that provided for carrying out the suggestions of the Jackson Report, but only partially funded the project. The State of California, which had already been working closely with the COE, formed the California Reclamation Board and matched federally appropriated funds, bringing the total available funding to $800,000.[4]

In early 1912, the COE contracted with the Ellicott Machine Co. of Baltimore for two hydraulic dredges, which were assembled in Pittsburgh, California. Christened the *Sacramento* and the *San Joaquin,* the dredges were capable of removing vast quantities of material from the river bed. Toward the end of the year, the COE also commissioned a dredge tender, the *Rio Vista.* The large dredges needed a new mooring ground, as the City of Sacramento waterfront used by the COE was becoming too crowded. Rio Vista was on the lower stretch of the Sacramento River, near the bend in the river at Horseshoe Island that slowed the Sacramento's flow. Straightening this bend and increasing the carrying capacity of the Sacramento near its mouth was a crucial element of the larger project, making Rio Vista a good location for the base. In addition, it was easily accessible from the San Joaquin and Mokelumne Rivers, where related projects were taking place, and was therefore chosen as the site of the U.S. Engineers Warehouse. The COE located the Rio

Vista base just to the south of the town, and constructed a 120' x 44' wharf with a 56' x 26' warehouse on it.[5]

U.S. Engineers Storehouse, Rio Vista[6]

The 32 acre site the COE acquired for the storehouse was south of the town of Rio Vista on the west bank of the river. In the mid-nineteenth century, the area was part of John Bidwell's Rancho Los Ulpinos. Later, the tract was acquired by the Joseph family. The COE took possession of the site in July, 1911. Up until the period when the COE began intensively developing the Rio Vista base, the entire area along the western bank of the river was a swampy marsh. [7]

Between July, 1912 and June 1913 the COE performed mostly work to maintain sufficient depth in the river for navigation: removing logs and snags between Sacramento and Red Bluff, dredging an obstruction, repairing wing dams near the American River, sounding and surveying, and repairing the snagboat. Spending to complete these limited projects was $34,078.94. The work picked up steam, however, after the federal government passed the Flood Control Act of 1917. This act marked the beginning of the Sacramento River Flood Control Project (SRFCP) and a transition for the COE, which began to focus as much on flood control as on aiding navigation. In the 1920 fiscal year, the COE dredged over 5,000,000 cubic yards of material. Although the bulk of the material dredged was from the crucial Horseshoe Bend area south of the storehouse, dredging also took place on the San Joaquin River, at Mare Island, and in various sloughs. Contracts with private companies for both clamshell and hydraulic dredges

[3] James and Singer, 131; Hagwood, p. 49 – 50; James and Singer, p. 131.
[4] *Report of the Chief of Engineers, U.S. Army, Part 1*, Washington, D.C.: Government Printing Office, 1910, p. 1012; Captain A.E. Anderson, "Sacramento River to be Widened as Part of Larger Plan for Controlling Flood Waters," San Francisco Call, August 4, 1912, 61:1-3; Hagwood, p. 52.
[5] *Report of the Chief of Engineers, U.S. Army, Part 1*, Washington, D.C.: Government Printing Office, 1913, p. 3173-3175.
[6] During its first decade of use the site was referred to as the U.S. Engineers Storehouse or U.S. engineer storehouse at Rio Vista. The name seems to have been informal, and usage shifted over the years. By the late 1930s, maps created by the COE referred to the U.S. Engineer Depot. This name persisted into the 1940s, although it was also referred to as U.S. Engineer Plant and U.S. Engineer Yard. In 1952, just before it is transferred to the Transportation Corps, it is referred to as U.S. Engineer Dockyard. After its re-designation as Rio Vista Transportation Corps Marine Depot, usage continued to shift. During the 1950s and 1960s the site was also referred to as U.S. Army Transportation Storage Activity, Rio Vista Depot Activity, Rio Vista Storage Area, and U.S. Army Reserve Activity.
[7] JRP Historical Consulting Services, *Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, Solano County, California, Draft,* February, 1997, p. 6; *Topographical Map, Rio Vista Quadrangle, California*, U.S. Geological Survey, Edition of May 1910.

supplemented the work of the *Sacramento* and *San Joaquin.* In addition to dredging activities, the COE constructed levees from dredging spoils, planted grass and trees on levees, and worked on bypass weirs. By 1920, the state and federal government had spent a combined $3,700,000 on the project.[8]

Expansion of federal funding in 1917 justified increased expenditures on the Rio Vista base. In 1917, a request to install telephone service at the base, (when telephones were still rare in the U.S.), was approved. In 1920, the COE moved the existing structures roughly ¼ mile southwest, outside the project channel and into the area that would become the core of the complex, the Waterfront and Marine Ways area. In all likelihood, the area was created by the COE when marsh land was filled with dredging spoils during project work. By 1920, the Carpenter Shop (T-7) and original Marine Ways, (no longer extant), were also present. A lumber shed had been constructed by 1923, and by 1929 the there was a cluster at least 7 buildings. Uses included storehouse, bunkhouse, carpenter shop, welding shop, paint storage, and pattern shed. In addition to the wharf and marine ways, the property also had a derrick. The COE's work began to have a measurable effect by the 1920s. The dredging work performed, in addition to the moratorium on hydraulic mining, meant that river beds were no longer rising, and in many places channels had significantly deepened. Throughout the 1920s and into the late 1930s the repair and maintenance of the water craft used in the SRFCP was the main mission performed at the Rio Vista base. In the fiscal year 1938, for example, the COE budgeted $31,903.34 for repairs on the *San Joaquin* and the *Pit*, (a motor tender).[9]

The SRFCP was modified in 1928 with federal passage of a new flood control act. The 1928 act shifted cost-sharing from 50-50 to one third federal and two thirds state/local funding. By this time the COE had significantly deepened the lower channel of the river and widened it to 3100'. The dredgers had also removed Wood Island, a 100-acre island directly opposite Rio Vista, and created Decker Island, which was formed by the cut at Horseshoe Bend. During the 1920s and 1930s the storehouse provided maintenance to a variety of watercraft associated with the SRFCP in addition to the dredges.[10]

By 1937, the Waterfront and Marine Ways area comprised at least 13 buildings as well as marine ways to the north and southeast of the Carpenter Shop. In addition, the water tower, 2 wharves, (including S-103), and a pier, (S-104), had been constructed. The site expanded significantly during late 1930s through the end of World War II. Between 1937 and 1942, the Carpenter Shop was expanded. The Machine Shop, (T-11) was pieced together during this period from separate blacksmith shop, welding shop, and machine shop buildings that were located in the vicinity of its current footprint. By 1946, it had reached its final form. 3 small ancillary buildings were also constructed during this period. In addition to the expansion and structural strengthening of T-22, 4 large new buildings were constructed for use as a shop, garages, and a warehouse. New and larger marine ways, which had been proposed in 1937, were built in the early 1940s, as well as 5 small buildings, most of which were sheds associated with the two marine ways at the northern end of the property. In addition, the primary wharf was expanded to its current footprint.[11]

Although the Flood Control Act of 1941 authorized federal expenditures for the completion of the Sacramento River Flood Control Project, the outbreak of the war shifted priorities for the COE from civilian infrastructure to military construction. In 1941, the Army Air Corps transferred responsibility for all construction to the COE, and the Army followed suit in 1942. During the first years of the war, the Sacramento District of the COE was building military facilities throughout the west and more than quadrupled in size. The *Sacramento* and *San Joaquin* were used for war effort-related dredging, such as deep water berths at Camp Stoneman, near Pittsburgh, California. The *Sacramento* was also used for dredging in the Pacific Islands. In 1941, its crew was dredging at Palmyra Island. It later came under Japanese fire while dredging a channel at Johnson Island.[12]

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[8] *U.S. Army, Part 1*, 1913, p. 1299; James and Singer, p. 131; *Report of the Chief of Engineers, U.S. Army, Part 2*, Washington, D.C.: Government Printing Office, 1920, p. 2974 – 2975, 2979.

[9] Letter, from L.H. Rand, Major, Corps of Engineers to Division Engineer, Pacific Division, San Francisco, California, June 8, 1917, RG 77 Records of the U.S. Army Corps of Engineers, Box 3A South Pacific Division General Administration Files, 41B, NARA, San Bruno, California; US Army, 1920, p. 2975; James and Singer, p. 131; Letter from L.B. Chambers, Colonel, Corps of Engineers, to the Division Engineer, South Pacific Division, San Francisco, California, December 9, 1937, RG 77 Records of the U.S. Army Corps of Engineers, Box 3A South Pacific Division General Administration Files, 403, NARA, San Bruno, California.

[10] U.S. Army Corps of Engineers, Sacramento District, *Post-Flood Assessment for 1983, 1986, 1995, and 1997, Central Valley, California,* 2002, p.2-12; JRP Historical Consulting Services, p. 8.

[11] Aerial Photograph, U.S. Department of Agriculture, August 20, 1937; U.S. Army Corps of Engineers, Maps and Plans, 1937 – 1942, on file at City of Rio Vista.

[12] U.S. Army Corps of Engineers, 2002, p. 2-12; JRP Historical Consulting Services, p. 9; Letter from J.R.D. Matheson, Colonel, Corps of Engineers to Chief of Engineers, U.S. Army, Washington D.C., August 30, 1941, RG 77 Records of the U.S. Army Corps of Engineers, Box 3A South Pacific Division General Administration Files, 209, NARA, San Bruno, California.

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Despite the expanded duties, the COE kept up maintenance dredging in the Sacramento River and its tributaries through the war years. By 1944, the Sacramento River Flood Control Project was 90% complete. After the war, several large dams and reservoirs were added to the project. The entire project was complete by 1968.[13]

Perhaps because of the COE's dual responsibilities during the war, the Rio Vista base went through its most rapid period of development between 1942 and 1946. The large Marine Ways near the northern end of the property was constructed during this period, as well as 15 new buildings. Many were ancillary buildings like sheds and a hothouse, and a number were subsequently demolished. Several large warehouses, garages, and shop buildings, most of which are extant, were also constructed during this period.

Rio Vista Transportation Corps Marine Depot

In 1952, the Rio Vista base was transferred to the Army Transportation Corps. The U.S. Engineer Dockyard, Rio Vista, California was re-designated the Rio Vista Transportation Corps Marine Depot, Rio Vista California. The name change and transfer marked a significant change in use. The Army now used the base to repair, store and preserve harbor craft rather than dredging equipment and river craft. The Army needed a variety of small craft, which had been in short supply during World War II to load and unload men and materiel. By the late 1950s, the Rio Vista base employed almost 300 civilians and provided storage for over 350 vessels. This period appears to have been the height of activity for the base. The expansion was large enough to have a noticeable positive effect on Rio Vista's economy.[14]

To accommodate this intensified activity and sharp increase in storage requirements, the Army began to develop new areas of the base. The transfer and change in use ushered in a new period of intensive development, in contrast to the immediate post-war period, when only one new building was constructed. In 1952, the existing roads were paved, and in 1954 the Army added new roads in the western portion of the site. By 1954, it had added a wharf and 8 new buildings to the complex, most of which were in the southern and western portions of the site, which had remained undeveloped up to this time. The Army made few floor plan changes to the older buildings in the Waterfront and Marine Ways area, but they worked on upgrading sewer, electrical, and performed minor alterations to the buildings through the end of the decade. The exception was the barracks building, which received the addition in 1958 which created its current floor plan. Between 1958 and 1963, the Army added another 8 structures including the concrete wharf east of the old Carpenter Shop. Many of the buildings constructed during the Transportation Corps era were small ancillary or temporary structures. During the later years of the Transportation Corps era, the Army began to lease small areas of the base, including easements to the City of Rio Vista and P.G. & E.[15]

The Transportation Corps utilized the Rio Vista base for roughly a decade. In the early 1960s, after U.S. involvement in the Korean War was over, activity at the Rio Vista base appears to have been minimal. Although the Rio Vista base was utilized for storage, Army activities were decreasing and the space leased out to other entities increasing. In addition to the easements, the U.S. Coast Guard was using the old Office, Carpenter Shop, and Concrete Wharf. The U.S. Air Force was using some of the warehouse facilities, and the Port of Sacramento also had a presence on the base. A private party named Elmer Wendt and the Hydraulic Dredging Co. were also lessees. In 1963, the Army transferred a four-acre parcel at the southeastern end of the base to the U.S. Coast Guard. The Rio Vista Transportation Corps Marine Depot was inactivated around the same time.[16]

Sharpe Army Depot

In December, 1964, the Rio Vista base, which was by this time under the command of the Materiel Corps, was activated and re-designated a class II activity of Sharpe Army Depot in Lathrop, California. As U.S. involvement in the Vietnam War gradually increased, the Rio Vista base was transformed once again. Its new mission was preparing, repairing, and restoring amphibious landing craft for use in the Southeast Asian war. In November, 1965, the Army announced its plan to triple the personnel on the base from 50 to 150. 32 vehicles were initially shipped to the base by rail. The vehicles were Lighter Amphibious Resupply Cargo

[13] James and Singer, p. 131.
[14] General Orders No. 97, J. Lawton Collins, Chief of Staff, U.S. Army, Washington, D.C., October 31, 1952; JRP Historical Consulting Services, p. 10-11.
[15] U.S. Army Corps of Engineers, Maps and Plans, 1942 – 1967.
[16] JRP Historical Consulting Services, p. 11; U.S. Army Corps of Engineers, Maps and Plans, 1963 – 1967.

(LARC's), and included LARC 5's, LARC 15's and LARC 60's. In 1967, the Rio Vista base had at least 120 personnel and continued to receive and process new LARC shipments. It was the only Army base that performed this type of duty.[17]

The Army made few changes to the existing buildings during this period, and utilized the open storage areas in the western portion of the base for LARC storage. New construction was limited to small sheds and other ancillary structures. In 1967, the Army planned a large LARC loading ramp at the southeastern edge of the property, along with a large new outdoor storage area for LARC's near the western edge of the property. The new LARC facilities are not extant, and may never have been constructed.[18]

After the war began to wind down in the mid-1970s the Rio Vista base was transferred to the U.S. Army Reserve. In 1995, the Army de-commissioned and abandoned the base, and it has remained vacant and unused since. In 2003, the Army sold the base to the City of Rio Vista for $30,000.

[17] General Orders No. 42, Harold K. Johnson, General, United States Army, Chief of Staff, Headquarters, Department of the Army, Washington, D.C., December 18, 1964; The Rio Vista News-Herald & Isleton Journal, "RV Army Base to Triple Force, Increase Role in War Effort, November 3, 1965; U.S. Army Corps of Engineers, Map, 1967.
[18] U.S. Army Corps of Engineers, Maps and Plans, 1963.

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
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Trinomial ______________
NRHP Status Code ______________
Other Listings ______________
Review Code ______ Reviewer ______________ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-7, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-7, Carpenter Shop, Ship Repair Shop, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614550 mE/ 4222885 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single-story wood frame building is located adjacent to the river at the northern edge of the property's primary cluster of buildings. It consists of a front-gabled primary volume with shed-roofed additions to the east and west that form an irregular plan. The primary roof features industrial vents, minimal eave overhang, and composition sheets. A large, top-mounted sliding door with a personnel door cut into it is centered in the main section of the north elevation. Similar doors in the corrugated metal section on the east have fallen away. Windows are 1-over-1 wood sash, and the foundation is concrete slab. The primary and west sections are clad in asbestos shingles, many of which have fallen off to reveal original wood siding or holes in the building. The east section is clad in corrugated metal.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: East and south elevations, camera facing east, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code ______
Other Listings ______
Review Code ______ Reviewer ______ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-8, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-8, Compressor Shed, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614550 mE/ 4222885 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The small single-story wood frame building is located between T-7 and T-11 near the north end of the primary cluster of buildings. It is rectangular in plan and features a front-gabled roof with moderate eave overhang, exposed rafter tails, and composition shingles. Both gable ends have louvered vents. Its entrance is left of center in its south elevation. Windows on east and west elevations are 6-over-6 wood sash, and the foundation is concrete slab. The building is clad in asbestos shingles, and most window panes are intact. Its west elevation is nearly engulfed in blackberry vines.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: East and south elevations, camera facing east, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Assessment for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________________
HRI # ____________________
Trinomial ____________________
NRHP Status Code ____________
Other Listings ____________________
Review Code ________ Reviewer ____________________ Date __________

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-9, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-9, Maintenance Shop, Carpenter Shop, Welding Shop, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** __; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614553 mE/ 4222867 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The large, single-story, double-height, wood frame building is located adjacent to the river south of building T-7. It is rectangular in plan, and has a front-gabled roof with minimal eave overhang and composition shingles. Two large, top-mounted sliding doors on the west elevation have fallen away. Personnel entrances located in the north and south elevations are also missing their doors. Windows, which are arranged in pairs, are 6-over-6 wood sash, and the foundation is concrete slab. Asbestos shingle cladding is missing in many places, revealing original wood siding, and most windows, as well as some window sashes, are broken.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: West and south elevations, camera facing northeast. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station..*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ___________
HRI # ___________
Trinomial ___________
NRHP Status Code ___________
Other Listings ___________
Review Code ___________ Reviewer ___________ Date ___________

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-11, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-11, Machine Shop, Welding Shop, Blacksmith Shop, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614533 mE/ 4222882 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The large, single-story, double-height, wood frame building is located at the northwestern edge of the primary cluster of buildings. It consists of three rectangular volumes joined to form an irregular plan. The primary volume has a front-gabled roof with industrial vents mounted atop it, minimal eave overhang, and composition shingles. Large, top-mounted sliding doors with personnel doors cut into them are located at the front and rear, (north and south), elevations. Windows are 6-over-6 wood sash. A shed-roofed section is attached to the west side of the main section. A rear wing, which is shorter than the main section, is attached to the west end of its south elevation. A louvered monitor is installed on the ridgeline of its gabled roof. Its south and east elevations have large, top-mounted, sliding doors. All three wings feature reinforced glass skylights and concrete slab foundation. Asbestos shingle cladding has fallen off in places, revealing original wood siding, and most skylights and windows, as well as some window sashes, are broken.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: North and west elevations, camera facing south, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 - 1946, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ___________

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code ____________
Other Listings ____________
Review Code ________ **Reviewer** ____________ **Date** ________

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-22, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-22, Garage, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** __; Diablo **B.M.**
c. Address Beach Drive City Rio Vista Zip 94571
d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614485 mE/ 4222865 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The wood-frame building is rectangular in plan and located to the north of T-23, (the water tower.) It has a flat corrugated metal roof and is comprised of three open bays with an enclosed portion at its south end. Cladding on the enclosed portion is corrugated metal, and the foundation is concrete slab. The east elevation features a large, top-mounted sliding door. The building is severely dilapidated and choked with vegetation, including trees growing through its roof.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing west, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ________

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code ______
Other Listings ______
Review Code ______ Reviewer ______ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) T-23, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: T-23, Water Tower, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614478 mE/ 4222829 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The tall metal water tower is located to the northwest of Building T-25 atop a small rise. It consists of a cylindrical metal tower with a conical metal roof supported by a meta tower.

***P3b. Resource Attributes:** (List attributes and codes) HP11: Engineering Structure

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: Water tower and hill, camera facing northwest, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
By 1937, USDA Aerial Photographs

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______________________
HRI # ______________________
Trinomial ______________________
NRHP Status Code __________

Other Listings ______________________
Review Code ________ Reviewer ______________________ Date ________

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-24, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-24, Pump House, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** __; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614487 mE/ 4222832 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The small wood-frame building, which was constructed as a pump house for the adjacent water tower, is rectangular in plan. It has a barrel roof and a small, top-mounted sliding door on the south elevation. Its single window, on the west elevation, has been boarded up. It is clad in asbestos shingles.

***P3b. Resource Attributes:** (List attributes and codes) HP4: Ancillary Building

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing northeast. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station..*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code ____________
Other Listings ____________
Review Code ________ Reviewer ____________ Date ________

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-25, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-25, Garage, Oil Shed, Paint Shop, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614517 mE/ 4222811 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The small wood-frame building is located near the center of the complex. It is rectangular in plan, and has a corrugated metal shed roof. The doors have fallen away from three personnel entrances on the east elevation, while an entrance on the west elevation is fitted with a wood panel door. Windows lack glazing or sashes, and the foundation is concrete slab. It is clad in a combination of corrugated and sheet metal.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing southwest. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1923 – 1937. JRP Historical Report, USDA Aerial Photographs

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

Page 1 ***Resource Name or #** (Assigned by recorder) T-26, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-26, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614510 mE/ 4222782 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The two story, wood-frame building is located between Buildings T-25 and T-27. It consists of a two story main volume joined to a single-story wing to form a "T". Both roofs are gabled with moderate eave overhang and composition shingle. The main entrance is on the north elevation, and is sheltered by a full-width upper verandah topped with a corrugated metal shed roof. The south (rear) elevation features secondary entrances on the first and second floors. An upper verandah has been enclosed on the rear elevation. Windows are 1-over-1 wood sash, and the foundation is concrete slab. Both sections of the building are clad in asbestos shingles, some of which have fallen off to reveal original wood siding. All windows are broken, and many window sashes are falling apart. The roof in the single story wing is severely deteriorated, and many portions are open to the elements.

***P3b. Resource Attributes:** (List attributes and codes) HP2: Multi-family property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing southwest. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1923 – 1929, JRP Historical Report

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Assessment for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____
HRI # ____
Trinomial ____
NRHP Status Code ____
Other Listings ____
Review Code ____ Reviewer ____ Date ____

Page 1 ***Resource Name or #** (Assigned by recorder) T-27, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-27, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** __; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614479 mE/ 4222709 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The large, two story, wood-frame building is located south of Building T-26. It is rectangular in plan. Its gabled roof has a large industrial vent mounted atop it, moderate eave overhang and composition. Large, top-mounted sliding doors provide access on the north and south elevations, the south door has fallen off. Doors are also missing from three personnel entrances on the east elevation. Windows are 6-over-6 wood sash, and the foundation is concrete slab. All windows are broken, and most sashes have fallen away.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing northeast Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Assessment for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code ____________
Other Listings ____________
Review Code ______ Reviewer ____________ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) T-41, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-41,Office, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614500 mE/ 4222712 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single story, wood-frame building is located between Building T-41 and S-104, a wharf. It is rectangular in plan, and its gabled roof has minimal eave overhang. No entrances are visible, and windows are 1-over-1 wood sash. The foundation is concrete slab. The south elevation is clad in asbestos shingles, some of which have fallen away to reveal original wood siding. North and east elevations are clad in bare board and batten. The entire west elevation and most of the north elevation are engulfed in vegetation. Windows are broken and/or covered with boards, and most sashes have fallen away.

***P3b. Resource Attributes:** (List attributes and codes) HP34: Military property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing northeast. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1923 – 1929, JRP Historical Report

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______________
HRI # ______________
Trinomial ______________
NRHP Status Code ______________
Other Listings ______________
Review Code ______ Reviewer ______________ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) T-42, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-42, Warehouse, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614479 mE/ 4222709 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The large, two story, wood-frame building is located west of T-41, near the southern end of the primary cluster of buildings. It is rectangular in plan, and its gabled roof has moderate eave overhang and composition. Large, top-mounted sliding doors provide access on the north and south elevations, both doors have large holes in them. Windows are 6-over-6 wood sash and arranged in pairs at the upper gable ends. The side elevations feature 6-over-6 windows arranged singly on the ground floor, with small multi-light fixed windows above. The foundation is concrete slab. Although many windows are broken most wood sashes are in relatively good condition.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing southwest. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1923 – 1929, JRP Historical Report

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______________

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____
HRI # ____
Trinomial ____
NRHP Status Code ____
Other Listings ____
Review Code ____ Reviewer ____ Date ____

Page 1 ***Resource Name or #** (Assigned by recorder) T-43, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-43, Paint Shop, Storage, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614475 mE/ 4222676 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single story wood-frame building is located at the southern end of the primary cluster of buildings. It is rectangular in plan. Its gabled roof has large industrial vents mounted atop it, minimal eave overhang, and corrugated metal. The entrance, which is on the north elevation, is a large, top-mounted sliding door with a personnel door cut into it. Small nearly square windows are fitted with fixed, multi-light wood sash. The foundation is concrete slab. The entire building is clad in corrugated metal. The gable ends each have two wooden louvered vents near the foundation, as well as several metal louvered vents. Except on the west elevation, windows are broken and sashes are missing.

***P3b. Resource Attributes:** (List attributes and codes) HP34: Military property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing northeast. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
By 1937, USDA Aerial Photographs

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station..*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code ______
Other Listings ______
Review Code ______ Reviewer ______ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) T-46, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-46, Storage, Female Barracks, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** __; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614438 mE/ 4222693 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single story wood-frame building is located at the southwestern end of the cluster of buildings. It is rectangular in plan. Its gabled roof has minimal eave overhang and composition shingle, although many sections of shingle are missing. No entrances are visible, and windows are 1-over-1 wood sash. The foundation is concrete slab. It is clad in asbestos shingles, many of which have fallen off to reveal original wood siding and holes in the building. The entire west elevation and most of the north elevation are engulfed in vegetation. Windows are 1-over-1 wood sash, but all are broken and most sashes have fallen away. The gable ends, (east and west elevation), are largely engulfed in vegetation, and a tree is growing through the roof.

***P3b. Resource Attributes:** (List attributes and codes) HP34: Military property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing north. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station..*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code ____________
Other Listings ____________
Review Code ________ Reviewer ____________ Date ________

Page 1 ***Resource Name or #** (Assigned by recorder) Building T-50, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: Building T-50, Temporary Storeroom, Rigging Loft, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; __ ¼ **of Sec** ___; Diablo **B.M.**
c. Address ____________ City Rio Vista Zip 94571
d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614352 mE/ 4222605 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The single story wood-frame building is located near the southwest corner of the property. It is rectangular in plan, and its flat roof is and without eave overhang. There are three entrances on the east elevation. The south entrance is large, lacks a door, and has a sign reading "Rigging Loft" above its opening. The center entrance has a large, top-mounted sliding door, and a third at the north end of the elevation is a personnel door. Window openings are irregular, and lack glazing and sashes. The foundation is concrete slab. A small volume with a low shed roof projects from the north elevation of the building. The building is clad in asbestos shingles, many of which have fallen away to reveal wood siding. Different areas of the building have different types of cladding underneath the shingles, including wood shingles, unpainted horizontal board siding, and unpainted vertical board siding. The building was constructed between 1942 and 1946 as a temporary storeroom, and the small projecting volume was used as a surveyors' storeroom. The building was leased to the U.S. Air Force in the 1960s. The use of a rigging loft is unknown. Missing doors and windows may have fallen away or been removed by vandals in the 17 years the property has been abandoned, but dates for these changes are unknown.

***P3b. Resource Attributes:** (List attributes and codes) HP8: Industrial property

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing northeast. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1942 – 1963, US Army COE Maps

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code ______
Other Listings ______
Review Code ______ Reviewer ______ Date ______

 ***Resource Name or #** (Assigned by recorder) S-102, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: S-102, Concrete Wharf, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**
c. Address Beach Drive City Rio Vista Zip 94571
d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614565 mE/ 4222879 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

S-102 is a large concrete wharf aligned along the riverbank to the north of S-103 and east of the major buildings in the complex. It is built of concrete, and is roughly 20 feet wide and 40 feet long. It features a wood and spring fender along the water's edge. It is heavily overgrown with reeds and other vegetation. It features large marine bollards.

***P3b. Resource Attributes:** (List attributes and codes) HP11: Engineering Structure

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: Wharf, camera facing north, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1958 – 1960, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ______
HRI # ______
Trinomial ______
NRHP Status Code ______
Other Listings ______
Review Code ______ Reviewer ______ Date ______

Page 1 ***Resource Name or #** (Assigned by recorder) S-103, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: S-103, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano
and (P2b and P2c or P2d. Attach a Location Map as necessary.)
***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**
c. Address ______ City Sacramento Zip 95814
d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614565 mE/ 4222879 mN
e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

S-103 is a large wharf aligned along the riverbank to the east of Building T-9. It is built of heavy wood planks and supported by wood pilings. It features large marine bollards. Several large and small holes have been cut into the plank surface of the wharf, and the pilings that support it are partially burned.

***P3b. Resource Attributes:** (List attributes and codes) HP11: Engineering Structure

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: Wharf, camera facing south, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1913 – 1936; USDA Aerial Photographs

***P7. Owner and Address:**
City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)
Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2013

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Assessment for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ______

State of California – The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code ____________
Other Listings ____________
Review Code ________ Reviewer ____________ Date ________

***Resource Name or #** (Assigned by recorder) S-104, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: S-104, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address ____________ City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614530 mE/ 4222715 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

S-104 is a wooden pier that extends into the river northeast of Building T-41. Wooden pilings and what appears to be a wooden walkway extend to the south of the pier. The wharf is inaccessible due to chain link fences and heavily overgrown vegetation, and details of its condition could not be recorded.

***P3b. Resource Attributes:** (List attributes and codes) HP11: Engineering structure

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.

P5b. Description of Photo: (View, date, accession #) Photograph 1: Wharf, camera facing south, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1929 – 1937, JRP Historical Report, USDA Aerial Photograph

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Assessment for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

Primary # ____________
HRI # ____________
Trinomial ____________
NRHP Status Code ____________
Other Listings ____________
Review Code ________ Reviewer ____________ Date ________

 ***Resource Name or #** (Assigned by recorder) S-105, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier: S-105, U.S. Engineers Storehouse Rio Vista

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address ____________ City Sacramento Zip 95814

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614494 mE/ 4222550 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The wide wooden pier extends into the river near the southern edge of the property. The heavy boards that comprise its decking are installed diagonally, and it features a large marine bollard at each corner of its eastern end.

***P3b. Resource Attributes:** (List attributes and codes) HP11: Engineering structure

***P4. Resources Present:** ☐ Building ☒ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing east, Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐ Both
1952 – 1954, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2013

***P10. Survey Type:** (Describe) Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Assessment for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☒District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record ☐ Other (list) ____________

State of California ♁ The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PRIMARY RECORD

Primary #
HRI #
Trinomial
NRHP Status Code

Other Listings
Review Code Reviewer Date

 ***Resource Name or #:** (Assigned by recorder) Marine Ways, U.S. Engineers Storehouse Rio Vista

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County** Solano

and (P2b and P2c or P2d. Attach a Location Map as necessary.)

***b. USGS 7.5' Quad** Rio Vista **Date** 2012 **T** 4N ; **R** 2E ; ___ ¼ **of Sec** ___; Diablo **B.M.**

c. Address Beach Drive City Rio Vista Zip 94571

d. UTM: (give more than one for large and/or linear resources) Zone 10 ; 614479 mE/ 4222709 mN

e. Other Locational Data: (e.g., parcel #, directions to resource, elevation, etc., as appropriate)

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries)

The Marine Ways is located near the northeastern edge of the property. Originally constructed to haul water craft out of the river, the structure consists of a wide wooden plank ramp that extends from the upper bank into the river. Four parallel metal tracks run along its length, and two wooden piers extend out over the river at either edge of the marine ways. A large metal carriage that was winched down the tracks for operation has been removed since the resource was recorded in 1997. An associated oakum shed and winch shed, once located nearby have also been demolished.

***P3b. Resource Attributes:** (List attributes and codes) HP11: Engineering Structure.

***P4. Resources Present:** ☒ Building ☐ Structure ☐ Object ☐ Site ☐ District ☒ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) Photograph 1: camera facing southwest. Photograph taken September 16, 2014.

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐ Both
1942 – 1946, US Army COE Maps

***P7. Owner and Address:**

City of Rio Vista
One Main Street
Rio Vista, CA 94571

***P8. Recorded by:** (Name, affiliation, address)

Kara Brunzell
1613 B Street
Napa, California 94559

***P9. Date Recorded:** September 16, 2014

***P10. Survey Type:** (Describe)
Intensive

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") *Historic Architectural Evaluation for the Delta Research Station.*

***Attachments:** NONE ☐ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record
☒ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☐ Photograph Record

Appendix B
Previous Documentation of Resources
(COE letters to SHPO)

DEPARTMENT OF THE ARMY
HEADQUARTERS, I CORPS AND FORT LEWIS
BOX 339500
FORT LEWIS, WASHINGTON 98433-9500

July 9, 1997

REPLY TO
ATTENTION OF:

Public Works

RECEIVED

JUL 14 1997

OHP

Ms. Cherilyn Widell
State Historic Preservation Officer
P.O. Box 942896
Sacramento, California 94296-0001

Reference: Rio Vista Army Reserve Center, National Register Determination
Log Number: USA940325A

Dear Ms. Widell:

On April 14, I wrote you with an agency determination that there are no buildings at Rio Vista Army Reserve Center that individually or collectively meet the eligibility requirements for the National Register of Historic Places. This determination was contrary to the recommendation of JRP Historical Services, a firm that studied the facility for us under contract with the Sacramento District Army Corps of Engineers.

On Monday, June 16, you visited the Rio Vista Army Reserve Center with me to examine buildings. At the conclusion of the visit you indicated that you concurred with the Army's determination of no properties for the Rio Vista Army Reserve Center. On June 20, I faxed a note to Hans Kreutzberg in which I made a request that the California Office of Historic Preservation finalize with written comment the National Register of Historic Places status of buildings at Rio Vista Army Reserve Center. I have prepared this letter to assist with that goal. Please indicate below by signature your concurrence with the Agency determination of no properties.

Sincerely,

Paul R. McGuff
Installation Cultural Resources
Management Officer

I have examined the evidence made available to me by the Army that pertains to the determination of National Register of Historic Places status of buildings and landscapes at the Rio Vista Army Reserve Center. Based upon review of these materials and a visit to that location I find that I concur with the Army's determination of no properties.

Signed: [signature] Date: July 15, 1997
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
HEADQUARTERS, I CORPS AND FORT LEWIS
BOX 339500
FORT LEWIS, WASHINGTON 98433-9500

REPLY TO
ATTENTION OF:

April 14, 1997

Public Works

Ms. Cherilyn Widell
California State Historic Preservation Officer
Office of Historic Preservation
Department of Parks and Recreation
P.O. Box 942896
Sacramento, California 94296-0001

Reference: USA940325A

Dear Ms. Widell:

On February 29, 1996, I wrote to you to indicate we would reevaluate government buildings at Rio Vista Army Reserve Center, Rio Vista, Solano County, California. We contracted through the Sacramento District, Army Corps of Engineers for that work. Enclosed you will find for review a draft report prepared by JRP Historical Consulting Services. While the JRP report has a professional appearance and contains valuable historical information, from Fort Lewis' perspective it did not successfully resolve several critical issues. I brought up these concerns with the Corps in a review of an earlier administrative draft. The Corps passed on the comments to JRP, and JRP made minor changes.

My unresolved concerns revolve around two principal issues: justification for the period of significance, and documentation of changes to buildings.

- The report identifies the period of significance as from 1919 to 1944. An end date of 1941 seems better justified because of changes in operations connected with the war. Another alternative is ca. 1919 to 1944, but with two distinct phases: construction of the Sacramento River Flood Control Project and Army operations related to the war effort.
- The period between 1923 and 1929 is central to either analysis. We needed to know how much of this building complex is still present.
- The building-by-building physical description is generally weak, with little or no analysis based on construction features and characteristics. Our minimal expectations for a description of each building included a discussion of overall size and proportion; roof line--height, angle, eaves treatment; siding--type, orientation, width; windows--size, sash, proportion, placement, trim; and, foundation.
- The report lacks a careful assessment of integrity. How much change and when? If changes date to a later period, then they may more nearly represent that period then the original. Is a later period relevant to the historic significance suggested?

JRP has provided no convincing argument for a high level of integrity. In fact there is evidence of changes which the report glosses over or omits. Nor has JRP argued successfully for significance of the built environment at Rio Vista. There is no question that something of historical note did occur at this place in the 1920s and 30s, yet the remaining 1940s and post-1940 altered building stock cannot reasonably be interpreted as strongly evocative of the pre-World War II events. Alternatively, we see no acceptable argument that there are any post-1940 events significant enough to evoke National Register of Historic Places consideration.

Based on a consideration of all available information, the Army determination is that there are no buildings at Rio Vista Army Reserve Center that individually or collectively meet the eligibility requirements for listing on the National Register of Historic Places. Please provide written comment to me within 30-days. Should you have any questions or desire additional information you may reach me by telephone at 206/967-5337.

Sincerely,

Paul R. McGuff
Installation Cultural Resource
Management Officer

Enclosure

Copy Furnished: Sacramento District

DEPARTMENT OF THE ARMY
HEADQUARTERS, I CORPS AND FORT LEWIS
BOX 339500
FORT LEWIS, WASHINGTON 98433-9500

MAR 5 1996

REPLY TO
ATTENTION OF:

February 29, 1996

USA940325A

Public Works

CC

See our attached letter in back.

Ms. Cherilyn Widell
California State Historic Preservation Officer
Office of Historic Preservation
Department of Parks and Recreation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Ms. Widell:

In previous coordination with Fort Lewis your office concurred with our determination that no building at Rio Vista meets the criteria for nomination to the National Register of Historic Places. I enclose correspondence from my files related to this determination. The original agency determination was based in large part upon information in our real property records that indicated all of the buildings at Rio Vista had original construction dates after 1950. Now I have map and text information available that will cause us to reevaluate our original determination. The purpose of this letter is to inform you of this new information and put forth our plans to resolve conflict brought about by the discovery of new information on the possible age of buildings at our Rio Vista facility.

Here is the new information. There was a military presence at Rio Vista by 1913. A report of that year on the dredge tender Rio Vista and construction for it indicates the Army Engineers built a 120 foot by 44 foot wharf and placed a 56 foot by 26 foot storehouse on that wharf at the town of Rio Vista. A history of the Sacramento District between 1929 and 1973 also mentions this 1913 construction. In 1910, a commission recommended a comprehensive plan prepared by the Sacramento District that suggested measures for improved navigation and flood control on the Sacramento and San Joaquin rivers. Congress didn't approve the whole plan at once but one of the earliest parts approved was the facility at Rio Vista to service work boats operating throughout the area. These work boats had removed more than 24,000,000 cubic yards of fill and debris from the Sacramento river by the end of June 1917. Frank E. Frey of the Sacramento District was in charge of the sub-district at Rio Vista from 1919 to 1935. He transferred in February 1936 to take charge of the job to create Treasure Island in San Francisco Bay for use as the site of the Golden Gate International Exposition.

A 1923 map indicates the 1913 buildings are gone by that date. This map shows two buildings and a wharf present on the site. The wharf of that date was only 50 foot long. The buildings are separate from the wharf. One of them is a 75 foot by 28 foot shop. The other is a lumber shed 95 foot long by 15 foot wide.

A later map, 1940 or 1941, indicates 11 buildings on site along with two wharves. Buildings on this map are not to scale, though from orientation and general massing it seems likely that the buildings present in 1923 are still there relatively unchanged at the start of World War II. Nine new buildings and an additional wharf were built on the site sometime between 1923 and 1940 or 1941.

A map from 1944 shows eight of the 11 buildings remain from the 1940 or 1941 period. It indicates that the 1923 buildings, if present are buried within changed buildings because the footprints of buildings at similar locations and with similar orientations to the 1923 buildings are much larger. It seems possible that the lumber shed has been split in half and moved to the south as two parallel wings attached to a larger building.

By 1953, only six of the 11 buildings remain from the 1940 or 1941 period. There are still buildings present at the correct location and with similar orientations to the 1923 buildings. However, buildings at these locations are again changed in their footprint.

In 1962, six of the 11 buildings remain from those shown on the 1940 or 1941 period map. Two buildings are at the correct location and with similar orientations to the 1923 buildings.

From the map and text information available to me today, it seems possible that two buildings constructed between 1913 and 1923, and shown on a 1923 map, may still exist at the Rio Vista facility. Four other buildings constructed between 1923 and 1940 or 1941 may still exist at the Rio Vista facility. All other buildings seem to date to the World War II period or afterwards. If the two early buildings exist they are camouflaged within the larger buildings that are present on the site today, and thus are considerably altered from their original condition. Building S-7, at the site of the 1923 shop, has dimensions of 75 foot by 45 foot: the 1923 building measured 75 foot by 28 foot. Building S-11, at the site of the 1923 lumber shed has dimensions of 190 feet by 60 feet: the 1923 building measured 95 feet by 15 feet. The four post-1923 and pre World War II buildings may be relatively intact since their footprints remain approximately the same through time.

I regret I could not provide you this information when, on March 22, 1994, we made an agency determination of no properties at Rio Vista. However, with new information, the results of my analysis are in question. The time of construction of the pre-World War II buildings that may remain at Rio Vista coincides with a period of delta reclamation important to the history of California and the west. Therefore, despite changes over the last 50 years and apparent loss of integrity in the two oldest buildings, we have advised the Sacramento district Army Corps of Engineers to delay any actions that would affect the buildings until we secure the services of a qualified architectural historian to further evaluate the government buildings at Rio Vista.

I would like you to reconsider your original concurrence with our determination of no properties based on the information I provide with this letter. I request that you withhold your final opinion until that time we make a new agency eligibility determination on the buildings. Please provide comment within 30-days. Should you have any questions or desire additional information, feel free to contact me. You may reach me by telephone at 206/967-5337.

Sincerely,

Paul R. McGuff
Installation Cultural Resource
Management Officer

Enclosures

Appendix J
SUPPORTING DOCUMENTATION FOR THE NOISE ANALYSIS

This appendix contains photos of the noise monitoring locations at both the Rio Vista Army Reserve Center and Ryde Avenue sites.

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Date: 2/17/15

Photograph 1

Site: Rio Vista Army Reserve Center

Measurement: LT-1

Western Site Boundary along Beach Drive
Rio Vista, CA

(View ESE)

Date: 2/17/15

Photograph 2

Site: Rio Vista Army Reserve Center

Measurement: LT-1

Western Site Boundary along Beach Drive
Rio Vista, CA

(View SSW)

Date: 2/17/15

Photograph 3

Site: Rio Vista Army Reserve Center

Measurement: ST-1

Western Site Boundary
along Beach Drive
Rio Vista, CA

(View ESE)

Date: 2/17/15

Photograph 4

Site: Rio Vista Army Reserve Center

Measurement: ST-1

Western Site Boundary
along Beach Drive
Rio Vista, CA

(View WNW)

Date: 2/17/15

Photograph 5

Site: Rio Vista Army Reserve Center

Measurement: ST-2

Sandy Beach Park Campground
Camp Site #6
Rio Vista, CA

(View SE)

Date: 2/17/15

Photograph 6

Site: Rio Vista Army Reserve Center

Measurement: ST-2

Sandy Beach Park Campground
Camp Site #6
Rio Vista, CA

(View NE)

Date: 2/17/15

Photograph 7

Site: Rio Vista Army Reserve Center

Measurement: ST-3

Sandy Beach Park Ranger House
Rio Vista, CA

(View N)

Date: 2/17/15

Photograph 8

Site: Rio Vista Army Reserve Center

Measurement: ST-3

Sandy Beach Park Ranger House
Rio Vista, CA

(View W)

Date: 2/17/15

Photograph 9

Site: Rio Vista Army Reserve Center

Measurement: ST-4

780 Beach Drive
Rio Vista, CA

(View NW)

Date: 2/17/15

Photograph 10

Site: Rio Vista Army Reserve Center

Measurement: ST-4

Sandy Beach Park Ranger House
Rio Vista, CA

(View SSW)

Date: 2/17/15

Photograph 11

Site: 845 Ryde Ave - Stockton

Measurement: LT-1

2635 W. Fremont Street
City Gardens Mobile Home Park
Stockton, CA

(View N)

Date: 2/17/15

Photograph 12

Site: 845 Ryde Ave - Stockton

Measurement: LT-1

2635 W. Fremont Street
City Gardens Mobile Home Park
Stockton, CA

(View W)

Date: 2/17/15

Photograph 13

Site: 845 Ryde Ave - Stockton

Measurement: ST-1

2923 Monte Diablo Ave
Stockton, CA

(View NNW)

Date: 2/17/15

Photograph 14

Site: 845 Ryde Ave - Stockton

Measurement: ST-1

2923 Monte Diablo Ave
Stockton, CA

(View SSE)

Date: 2/17/15

Photograph 15

Site: 845 Ryde Ave - Stockton

Measurement: ST-2

2702 Monte Diablo Avenue
Stockton, CA

(View SSE)

Date: 2/17/15

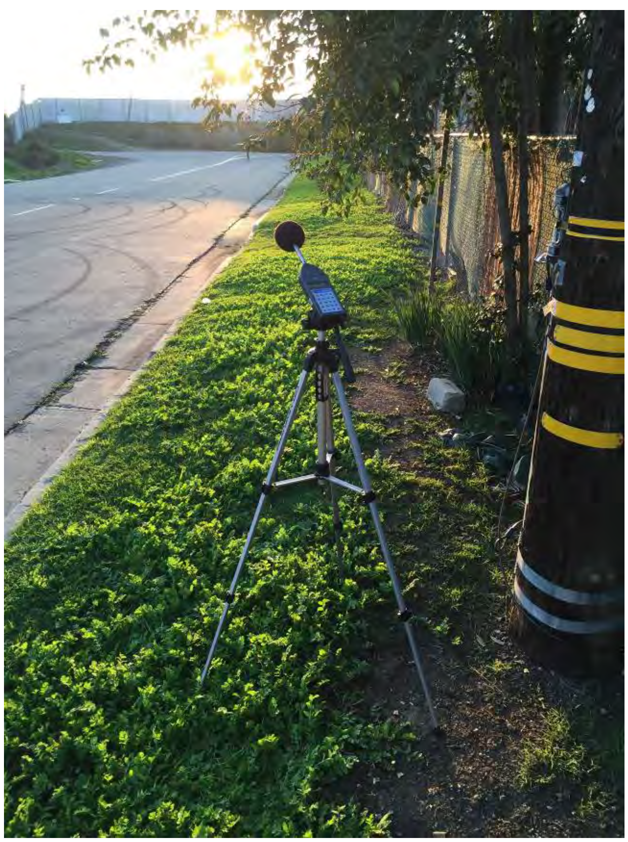
Photograph 16

Site: 845 Ryde Ave - Stockton

Measurement: ST-2

2702 Monte Diablo Avenue
Stockton, CA

(View ENE)

			**Date:** 2/17/15 **Photograph 17** **Site:** 845 Ryde Ave - Stockton **Measurement:** ST-3 2635 W. Fremont Street City Gardens Mobile Home Park Stockton, CA (View N)
			**Date:** 2/17/15 **Photograph 18** **Site:** 845 Ryde Ave - Stockton **Measurement:** ST-3 2635 W. Fremont Street City Gardens Mobile Home Park Stockton, CA (View WSW)

Date: 2/17/15

Photograph 19

Site: 845 Ryde Ave - Stockton

Measurement: ST-4

2319 W. Fremont Street
Stockton, CA

(View WSW)

Date: 2/17/15

Photograph 20

Site: 845 Ryde Ave - Stockton

Measurement: ST-4

2319 W. Fremont Street
Stockton, CA

(View NNW)

Appendix K
DELTA RESEARCH STATION ESTUARINE RESEARCH STATION/FISH TECHNOLOGY CENTER SITE SCREENING REPORT

This appendix contains the screening report documenting the process used to select the locations for the Proposed Project alternatives.

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Delta Research Station

Estuarine Research Station/Fish Technology Center

Site Screening Report

Prepared by Horizon Water and Environment

for the

California Department of General Services

July 2014

1.0. Introduction

Horizon Water and Environment (Horizon) is contracted with the California Department of General Services (DGS) to provide planning and environmental services on behalf of DGS, the California Department of Water Resources (DWR), and the U.S. Fish and Wildlife Service (USFWS) – collectively, the "Project Team" – in support of the Delta Research Station (DRS). The DRS has three components, the Estuarine Research Station (ERS), Fish Technology Center (FTC), and a hatchery. This site screening report focuses on the ERS and FTC, which is referred to in this report as the Project. The hatchery will be addressed in a separate site screening report.

The ERS would consolidate over 160 State and federal employees from the Interagency Ecological Program (IEP) and provide facilities for science and research efforts. ERS facilities would include office space, laboratory facilities, warehouses, and a marina.

The FTC would be a center for propagation, conservation, and study of rare Delta fishes.

The ERS and FTC are intended to be co-located with one another, and will be the subject of a joint Environmental Impact Report (EIR)/Environmental Impact Statement (EIS) in compliance with the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA).

This report summarizes the site screening process and the results of the process for narrowing down sites for evaluation in the EIR/EIS. This report includes the following:

- The process by which sites were identified for the Project,
- Sites that are recommended to be considered but eliminated from further EIR/EIS analysis,
- Sites that are recommended to be carried forward for further analysis in the EIR/EIS

The remainder of this report is organized as follows:

Section 2. Overview of CEQA and NEPA Requirements

Section 3. ERS/FTC Alternatives Development and Screening

Section 4. References

Appendix A. Real Estate Advertisement for Sites Suitable for Development of the ERS/FTC

Appendix B. Level 2 Site Screening Matrix

Appendix C. Screening Results for the Rio Vista Army Reserve Center

Appendix D. Screening Results for 845 Ryde Avenue, Stockton

Appendix E. Screening Results for 2151 Wilbur Avenue, Antioch

Appendix F. Screening Results for South River Road Property, West Sacramento

2.0 Overview of CEQA and NEPA Requirements

Both the California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) require that an EIR/EIS analyze the effects of a reasonable range of *feasible* project alternatives so that decision makers will have a basis for selecting an effective and environmentally favorable project approach. Only alternatives that are both feasible and satisfy most of the project's objectives need to be evaluated.

The term "feasible" is applied similarly in CEQA and NEPA, although NEPA typically often uses the term "reasonable." Under CEQA, "feasible" is defined as being capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, legal, and technological factors (Pub. Res. Code Section 21061.1; CEQA Guidelines Section 15364). NEPA does not have a stated definition of feasibility or reasonability, though the definition of feasibility under CEQA can be applied. In practice, NEPA generally restricts its alternatives to those that meet the agency's Purpose and Need. CEQA (but not NEPA) also requires an explanation of why the rejected alternatives are considered infeasible (CEQA Guidelines Section 15126.6(c)). CEQA includes within the scope of reasonable alternatives those that are "capable of avoiding or substantially lessening any significant effects of the project, even if those projects would impede to some degree the attainment of the project objectives or would be more costly" (CEQA Guidelines § 15126.6(b)).

The range of alternatives considered in an EIR/EIS typically includes several "build" alternatives that would involve taking some action or constructing new facilities. In addition, both CEQA and NEPA require analysis of the effects of choosing not to implement a project solution. This is referred to as the *No Project Alternative* under CEQA and as the *No Action Alternative* under NEPA (both hereafter referred to as the No Project Alternative).

The EIR/EIS will contain summary descriptions for the alternatives that were eliminated from detailed evaluation. The EIR/EIS will also contain more detailed descriptions for the alternatives carried forward for detailed evaluation, including: the design concept; new facilities that would be required; the activities and equipment needed to construct new facilities; and likely operational scenarios. Estimated costs may also be presented.

The EIR/EIS, as part of its alternatives evaluation, will consider several sites for the Project. This report was developed in order to assist in identifying appropriate sites for evaluation in the EIR/EIS.

3.0 ERS/FTC Alternatives Development and Screening

This section summarizes the process for identifying and screening potential sites for further evaluation alternatives in the EIR/EIS.

Alternatives screening refers to the process of evaluating a broad range of conceptual alternatives to identify those that should be carried forward for detailed EIR/EIS analysis. The purpose of the screening process is to systematically narrow the range of possible alternatives to focus increasingly detailed evaluations on the more feasible and promising alternatives. Alternatives screening is a key phase in project development, because it helps project sponsors to identify and focus on the most workable solutions to a problem.

3.1 Alternatives Development and Screening for the Project

The Project Team used an integrated approach to alternatives development and screening for the Project, incorporating a combination of engineering analysis and environmental review. For the Project, this approach entailed three basic steps – Level 1, Level 2, and Level 3 screening (described further below).

An essential component of any screening process is the development of evaluation criteria that allow the Project Team to identify the more feasible and promising alternatives at each stage of the process. Evaluation criteria for the Project were developed on the basis of project objectives (i.e., the degree to which a potential site would satisfy the stated project objectives) and the feasibility. The stated objectives of the Project are to:

1. Enhance interagency coordination, collaboration, and cost-effectiveness by developing a central research facility (the ERS) and co-locating it with FTC.
2. Locate the Project in a central location within the San Francisco Bay/Sacramento–San Joaquin Delta Estuary (Estuary) to facilitate ease of conducting Estuary research;
3. Provide a facility to accommodate boat storage (marina and dry dock), vehicle and boat repair, laboratory, fish propagation, equipment and feed storage, administrative, and meeting activities.
4. Monitor the Estuary's water quality, habitat and aquatic biota;
5. Identify the conservation research needs of the Estuary's rare fish species;
6. Develop the captive propagation technologies necessary to help restore the Estuary's rare fish species; and
7. Develop a new regional science center that advances the interests of researchers, local communities, and others that are dependent on the Estuary.

Additional information on the development and refinement of screening criteria is provided in the following paragraphs.

3.1.1 Level 1 Screening

Several sources provided key input in the initial identification of potential Project sites, including the Project Team, previous and ongoing studies, and a public advertisement. The goal of Level 1 alternatives screening was to identify sites that passed the following screening criteria:

1. Site(s) contained a minimum of 17 contiguous acres.
2. Site(s) is located within 15 miles of amenities, including housing.
3. Site(s) is located within 15 miles of a major State highway.

Based on the input from the sources listed above, the Project Team identified 12 alternative sites that passed Level 1 screening for the ERS/FTC:

1. Rio Vista Army Reserve Center, Rio Vista, CA
2. White Slough (next to I-5), Lodi, CA
3. DuPont Factory, Oakley, CA
4. South River Road property, West Sacramento, CA
5. 0 Tyler Island Road and W Tyler Island Bridge Road, Isleton, CA
6. 2935 Canright Road, Rio Vista, CA

7. 2151 Wilbur Ave, Antioch, CA
8. 29829 Jefferson Blvd., Clarksburg, CA
9. Goosehaven Road and Creed Road, between Fairfield and Rio Vista, CA
10. 845 Ryde Ave, Stockton, CA
11. Airport Road Site #1, Rio Vista, CA
12. Airport Road Site #2, Rio Vista, CA

The advertisement for sites is included in Appendix A of this report.

3.1.2 Level 2 Screening

The purpose of Level 2 screening was to further eliminate sites that failed to meet basic project objectives or fundamental tests of technical, legal, or economic feasibility. A major difference between Level 1 and Level 2 screening is that Level 1 screening was based on responses to an advertisement for suitable sites, while Level 2 screening involved desktop analysis of those sites. Level 2 screening criteria continued to focus on overall feasibility and constructability.

The following screening criteria were identified for Level 2 screening:

1. Site meets the minimum acreage requirement (17 acres)
2. Site is centrally located within or immediately adjacent (less than 2 miles) to the Delta.
3. Site is located within 15 miles of amenities including housing
4. Site is located within 15 miles of major State highway
5. Waterfront access to a major Delta waterway to provide for 20-slip Marina
6. Groundwater quality

Level 2 screening used a simple matrix with rankings for each criterion to track the evaluation of the sites. Each site was rated on a scale from 1 to 3 for each criterion. A score of 1 meant that the site failed, and did not satisfy the criterion. A score of 2 meant that it was unknown at this level of analysis whether it would satisfy the criterion. A score of 3 meant that the site passed, and satisfied the criterion. The Level 2 screening matrix is included in Appendix B of this report.

Level 2 Screening Results

In the Level 2 screening process, the Project Team evaluated the 12 aforementioned sites relative to the criteria listed above that addressed their overall construction feasibility. The following six sites passed all of the Level 2 screening criteria:

1. Rio Vista Army Reserve Center, Rio Vista
2. South River Road property, West Sacramento
3. 2151 Wilbur Ave, Antioch
4. 29829 Jefferson Blvd, Clarksburg, CA
5. 845 Ryde Ave, Stockton

The remaining sites failed because they either (1) did not have waterfront access, (2) were not centrally located within or immediately adjacent to the Delta, and/or (3) had contaminated groundwater. After Level 2 screening had been complete, the Jefferson Blvd. site became unavailable and also was removed from further consideration.

3.1.3 Level 3 Screening

All available sites that passed Level 2 screening evaluation were carried forward for a third, more intensive round of screening. The locations of the four sites are shown on Figures 1 through 5. The purpose of Level 3 screening was to further limit the number of site alternatives to a reasonable range to be carried forward for further evaluation in the draft EIR/EIS.

Level 3 screening criteria were developed by the Project Team (see Table 1). These criteria are more detailed and more specific than those applied in the Level 1 and Level 2 screening. Two criteria that were initially identified were discarded during the Level 3 screening process because they did not have meaningful differences to discriminate among the sites. Criteria discarded were (1) proximity to housing and transportation, and (2) geotechnical constraints. All four sites received the highest possible score for each of these criteria.

Each criterion in Table 1 was assigned a relative weight based on its value in characterizing the most suitable sites for further evaluation in the EIR/EIS. The relative weighting for each criterion was determined by the Project Team.

Determining Site Scores. For each site, each criterion was assigned a score of one, 50, or 100, with 100 being the maximum favorable score in terms of feasibility.[1] For example, a site that was highly compatible with existing/planned uses for adjacent land was assigned a 100 for that criterion. Each score for each criterion was then multiplied by the criterion's assigned weight (5% in the case of the example above). A *total* weighted score for each site could then be determined by summing its weighted scores across all criteria.

Table 1. Level 3 Screening Criteria.

Criterion	Level 3 Weight
1. Compatibility with existing/planned uses for adjacent land	5%
2. Access to utilities, including power, sewer and telecommunications	5%
3. Suitability for development of a marina	15%
4. Centrally located within IEP monitoring region	15%
5. Biological resources constraints	5%
6. Cultural resources constraints	5%
7. On-site environmental contamination	10%
8. Suitability of water supply for facility operations	15%
9. Vulnerability to flooding and sea level rise	15%
10. Ability to accommodate a Fish Hatchery on-site or in close proximity	10%
Total	**100.0%**

[1] The marina suitability criterion was scored between 1 and 100 based on an average of 9 sub-criteria scored as a 1, 50 or 100.

Descriptions of Screening Criteria

The following descriptions provide additional detail regarding the considerations for each screening criterion.

1. **Compatibility with existing/planned uses for adjacent land.** Existing or reasonably foreseeable future uses on the parcels adjacent to or in close proximity to each site were identified. Sources of information included the site visit, land use and zoning maps, aerial photographs, and other publicly available information. Existing and/or planned uses were compared against the proposed use of the site for the FTC and ERS to identify potential conflicts or incompatibilities.

2. **Access to utilities, including power, sewer and telecommunications.** For each site, the potential provider(s) of power, sewer and telecommunications were identified. The distance of service extensions were evaluated, such as the distance to the closest sewer trunk line. Sites requiring longer infrastructure extensions or on-site utilities (e.g., a septic system) were ranked relatively lower.

3. **Centralized Location within IEP Monitoring Region.** The Interagency Ecological Program's (IEP) long-term monitoring activities occur roughly within a region bounded by the cities of Sacramento, San Francisco, San Jose, and Stockton. This criterion scores each site based on the degree to which the site is centrally located within the IEP monitoring area. The more centrally located the ERS/FTC is with respect to IEP monitoring stations, the less average travel time and cost would be incurred. Figure 6 shows the location of each site within the context of the IEP monitoring region.

4. **Suitability for development of a marina.** Each site was evaluated for its potential to house a marina consisting of approximately 20 single slips for power boats from 21 to 60 feet in length, averaging approximately 38 feet in length, with a water area of approximately 2 acres, including support services such as boat launch, fixed pier/wharf with hoist for transferring heavy equipment, and marina services (shore power, potable water, fueling and pump out capabilities). The criteria used to evaluate the suitability of each site for the development of the ERS marina are as follows:
   a. *Waterfront and backland support area suitability.* These two criteria considered the size and shape of the site to accommodate the design of the required marina, boat launch, and marina services. An optimal site would have adequate waterfront area to allow a variety of basin, entrance and boat launch configurations as well as ample backland area for boat storage and other associated uses. Also noted was whether the site permitted an in-channel marina, or required the creation of an off-channel basin. An off-channel basin would require excavation, consuming part of the available land area, and was less desirable.
   b. *Water level variation.* Water level variation can impact the ability to utilize the wharf/pier to transfer equipment to vessels as well as the ease of access to the docks from the shoreline. Large variations create challenges that other sites with lower variation do not present.

c. *Accessible depths.* Adequate depth for the proposed vessels to be served by the marina in the adjacent waters are necessary so that access to the marina is not limited by water level fluctuations or create the need for a dredged access channel. Insufficient depths at low water affect a given site's ability to operate and are less desirable. Depths were obtained from Wang & Ateljevich (2012).
d. *Site grading/excavation requirements.* Existing site grades can impact the initial costs to develop the marina and the ability to access vessels from the shoreline. While a site that is well above the known flood elevations is good for flood protection, excessive elevation results in the need for high volumes of excavation to create an off-channel marina basin, if required. Additionally, sites with large topographic relief would require extensive grading or limit the area available for marina development by incurring large costs to create the area needed for marina, boat launch and storage operations. This made fairly flat sites a few feet above flood elevations more desirable.
e. *Impact of commercial traffic.* Commercial traffic from container ships, tankers, etc., can generate vessel wake which can be problematic for berthed vessels, boat launching operations, and loading/unloading of equipment at the pier/wharf without protecting the marina with breakwaters. Sites adjacent to the Stockton or Sacramento deep water ship channels would have a higher likelihood of problematic ship wake and are therefore less desirable than an equivalent site without the frequent vessel wake. If an off-channel basin would be needed at a given site, this criterion was cancelled out.
f. *Sedimentation potential.* A site with a high sedimentation rate can incur high maintenance costs associated with frequent dredging to maintain required depths and would be less desirable than a sight with a low sedimentation rate. The experience of other marinas in the vicinity of the site was used as an indicator of the potential for a high sedimentation rate.
g. *Waterborne debris potential.* A site exposed to log and other large waterborne debris would require protection measures such as debris deflectors and would have a higher risk for damage. The existence of debris deflectors at other water front facilities in the vicinity of the site was used as an indicator of the potential for debris being an issue. If an off-channel basin would be needed at the site, this criterion was cancelled out.
h. *Flood hazard area.* This criterion looked at whether the site elevations were above existing flood levels, and if levees would be utilized to protect the site. A site which is protected by levees due to low land elevations with respect to flood levels is more complicated for marina construction and operation of the marina and boat launch, particularly if a new levee would be required to surround an off-channel marina basin.
i. *Marine services.* Sites which are located in close proximity to marina services such as fuel and pump out were considered more desirable than a site which these services are not readily available.

Each site was evaluated based on the above listed criteria and scored for their relative suitability. For the sites where it was considered that an in-channel or off-channel marina was possible, each was scored separately and then the higher of the two scores was used for ranking.

5. **Biological resources constraints.** Each site was evaluated for its potential to provide habitat for special-status species or sensitive natural communities such as riparian forest or wetlands. The evaluation included a site visit and a search of the California Natural Diversity Database (CNDDB) to identify known occurrences of special-status plant and wildlife species on or in proximity to the site. A desktop review of the National Wetland Inventory (NWI) database was also conducted to identify potential wetlands at the sites. Other data sources were consulted, as appropriate, to identify known biological resources constraints.

   For the purposes of the site screening, a special-status species refers to those species that meet one or more of the following criteria:
   - Species that are listed or proposed for listing as threatened or endangered under the federal Endangered Species Act (ESA) or California Endangered Species Act (CESA)
   - California Department of Fish and Wildlife (CDFW) or U.S. Fish and Wildlife Service (USFWS) "Species of Special Concern"
   - California Rare Plant Rank List 1 and 2 species.

6. **Cultural resources constraints.** A records search of the California Historical Resources Information System was conducted for each site and a ¼-mile buffer off of the site, to determine whether known cultural resources have been recorded within or adjacent to the site. The likelihood of unrecorded cultural resources was assessed based on historical references and the distribution of environmental settings of the site and surrounding area.

7. **On-site environmental contamination.** A desktop screening evaluation was completed for environmental contaminants where a standard record search package for each site was ordered from Environmental Data Research (EDR). The ASTM 1527 13 requirements were followed as a guide to complete this desktop evaluation. The activities completed during this screening evaluation did not include field sampling. Reports and data for each site were reviewed based on the following screening criteria:
   a. Location of Contaminant, if found (at the subject property, at adjoining properties, or surrounding properties)
   b. Contaminant Risk (contaminant type, contaminant quantity, and contaminant hazard)
   c. Potential for contaminants not identified in the reports and data to exist at the subject property or adjoining properties due to previous site activities

8. **Suitability of water supply for facility operations.** Each site was reviewed for the availability of groundwater to meet the demands of the facilities. Geologic maps, groundwater reports (e.g., DWR Bulletin 118), and other readily available groundwater information were consulted as part of the analysis. Conceptual water quality criteria for rearing of Delta smelt were provided by MHW for screening of groundwater quality. These criteria are provided in Table 2.

Table 2. Conceptual water quality screening criteria for delta smelt rearing

Parameter	Units	Design Value	
Flow	gpm	750 gpm, initially	3,000 gpm, future
Temperature	°C	15 – 18	
Salinity	ppt	0 – 3.9	
D.O.	mg/l	6 – 8.0±	
Turbidity	NTU	<5 – 25	Preferred <5 – 10
pH	pH units	>7 – 8.2	
Total ammonia nitrogen (TAN)	g/l	<0.2 – 0.39	(<0.2 preferred)
Source: MHW 2008			

The temperature of groundwater from deeper wells is expected to be sufficiently cool that it would be within the acceptable range for all sites. Turbidity levels of groundwater are also typically low and well within the tolerance levels of the species which may be propagated at the FTC. pH data were not available for the groundwater underlying any of the sites, and would need to be tested; however, it is expected to be within acceptable levels or could be readily adjusted. TAN is almost never present in appreciable quantities in groundwater due to the absence of inputs from organic sources, and anaerobic conditions in groundwater; nitrogen in groundwater is more typically found in the form of nitrate. Dissolved oxygen levels in groundwater are typically low, and it is expected that all sites would require aeration to ensure that dissolved oxygen would be at acceptable levels.

Because the parameters above are all expected to be within acceptable ranges, and the sites cannot be distinguished without further primary data collection, these parameters are not considered further in this evaluation. Instead, the evaluation focuses on groundwater quantity, yields, salinity, and potential hazardous materials contamination. A site's score considered both the likely quantity and quality of groundwater relative to Project needs.

9. **Vulnerability to flooding and sea level rise.** Each site was evaluated for the extent to which it is located partially or entirely within the 100-year floodplain, based on Federal Emergency Mapping Agency Flood Insurance Rate Maps and Flood Insurance Studies. Each site was also evaluated for its potential to be inundated by sea level rise (SLR). A sea level rise (SLR) scenario of 55 inches (1.4 meters) above existing Mean Higher High Water (MHHW) was used for the screening. The MHHW +55-inch SLR scenario represents the average value for worst-case scenarios of sea level rise adopted by the State Coastal Conservancy and the State Lands

Commission and recommended by the Delta Vision Blue Ribbon Task Force. Considerations included the severity and aerial extent of the flooding or SLR hazard on the site, and the ability to locate facilities outside of the hazard areas. Avoidance of inundation using excavation or other means (e.g. levees) were also considered, although such measures would generally result in a lower score for the site.

10. **Ability to Accommodate a Fish Hatchery On-Site or in Close Proximity.** USFWS is proposing to construct a Fish Hatchery along the waterfront within the San Francisco/Sacramento – San Joaquin Delta Estuary (Estuary). The Hatchery would create a production facility capable of producing fish from broodstock should supplementation or reintroduction be determined to be necessary or appropriate for recovery of the relevant fish species. The closer the ERS/FTC and Hatchery are located to one another, the more efficient the collaboration between each facility's research group. A site that can accommodate both the ERS/FTC and the Hatchery would receive a high score. An ERS/FTC site that could be located within 10 miles of an available site suitable for the Hatchery would receive a moderate score. Sites that cannot achieve either would receive a low score.

Level 3 Screening Results

Evaluation of sites for the Level 3 screening began with the collection of desktop data to characterize the various sites relative to the criteria. A reconnaissance-level site visit was also conducted. The results of these site investigations are summarized in Appendices C, D, E, and F. Based on the findings for each criterion, each site was then scored using the approach described above. The weighted scores for the Level 3 sites are provided in Table 3 below.

Table 3. Level 3 Site Ranking

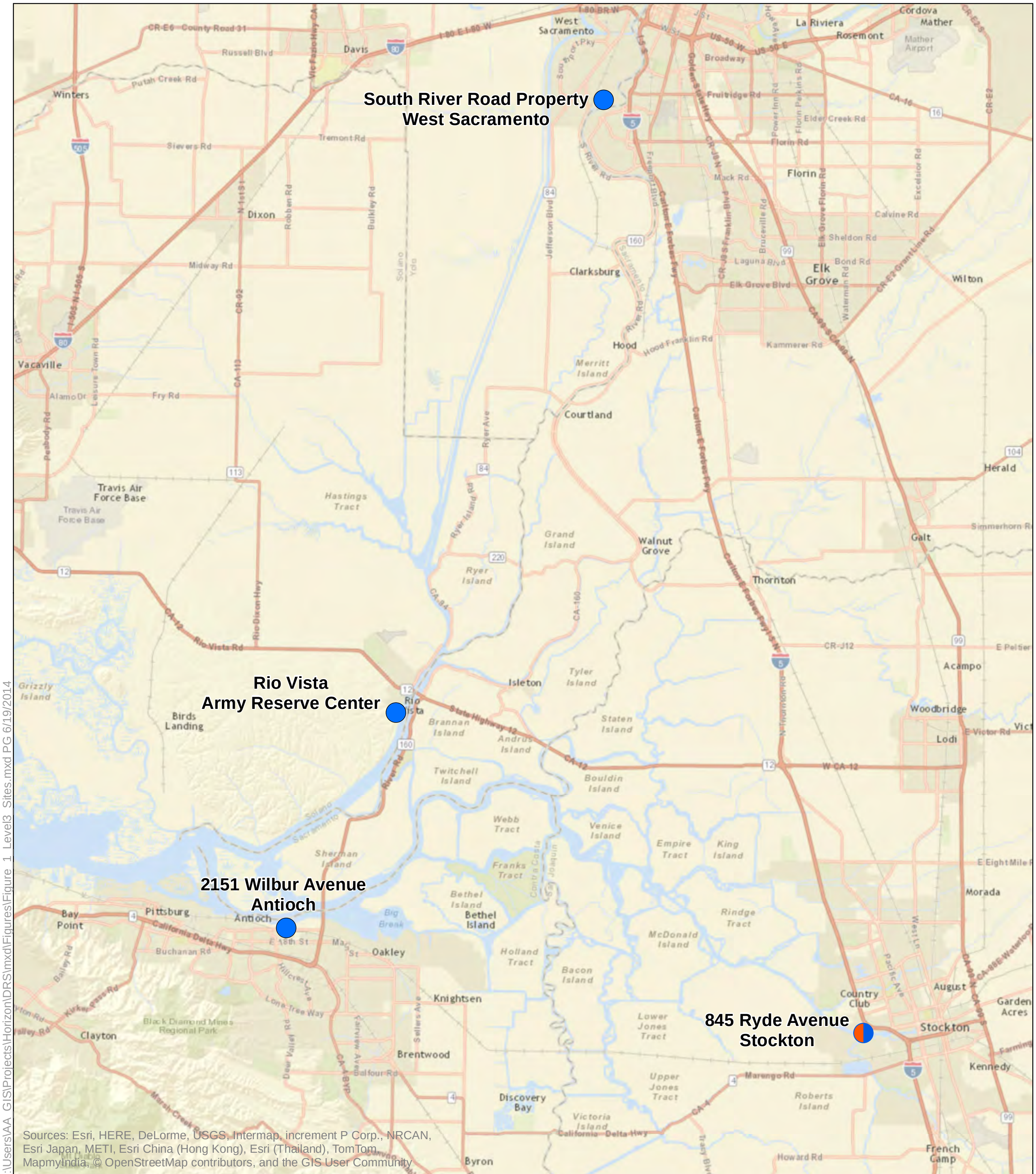
Criterion	Rio Vista	Ryde	Wilbur	S. River Rd
1. Compatibility with existing/planned uses for adjacent land	5	5	5	0.05
2. Access to utilities, including power, sewer, and telecom	5	5	5	2.5
3. Suitability for development of a marina	14.25	13.5	14.25	6
4. Centrally located within IEP monitoring region	15	0.15	15	0.15
5. Biological resources constraints	2.5	5	0.05	0.05
6. Cultural resources constraints	2.5	2.5	2.5	2.5
7. On-site environmental contamination	5	10	0.1	10
8. Suitability of water supply for facility operations	15	0.15	7.5	7.5
9. Vulnerability to flooding and sea level rise	15	15	15	0.15
10. Proximity to potential hatchery site	5	10	0.10	0.10
TOTAL SCORE	**84.25**	**66.3**	**64.5**	**29**

The two highest scoring sites – the Rio Vista Army Reserve Center and 845 Ryde Avenue, Stockton – are recommended for further evaluation in the EIR/EIS. The Ryde Avenue site was selected over the Wilbur Avenue site because the latter site is located largely within critical habitat for the Antioch Dunes evening-primrose and the Contra Costa wallflower. Both of these plant species are federally-listed and state-listed as endangered. In addition, the Wilbur site contained areas of concern due to substantial environmental contamination.

4.0 References

MHW. 2008. Technical Memoranda No. 1: Delta Smelt Hatchery Water Quality and Water Treatment Conceptual Evaluation. Prepared for U.S. Fish and Wildlife Service. July.

Wang, R. and E. Ateljevich. 2012. A Continuous Surface Elevation Map for Modeling. Chapter 6 in *Methodology for Flow and Salinity Estimates in the Sacramento-San Joaquin Delta and Suisun Marsh*, 23rd Annual Progress Report to the State Water Resources Control Board. California Department of Water Resources, Bay-Delta Office, Delta Modeling Section.



N

0 2.5 5 10
Miles

Possible Site Use

- ERS/FTC Only
- ERS/FTC and Hatchery

Figure 1

Level 3 Screening Sites

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N

0 0.125 0.25

Miles

Horizon WATER and ENVIRONMENT

Parcel Boundary

Figure 2

Rio Vista Army Reserve Center

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N

0 0.125 0.25

Miles

Parcel Boundary

Horizon WATER and ENVIRONMENT

Figure 3

845 Ryde Avenue, Stockton

Figure 4

2151 Wilbur Avenue, Antioch

Horizon WATER and ENVIRONMENT

Figure 5

South River Road Property
West Sacramento

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Figure 6

Site Locations Relative to IEP Monitoring Activities

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APPENDIX A

Real Estate Advertisement for Sites Suitable for Development of the ERS/FTC

Newspaper Advertisement (Sacramento Bee, Contra Costa Times, Stockton Record):

SITES WANTED: State of CA, Dept. of Water Resources and the United States Fish and Wildlife Services seek land for 3 facilities in or adjacent to the Sacramento-San Joaquin River legal Delta. Site 1: 12+ acres, within 2 mi. proximity to the legal Delta boundary. Waterfront access required. Site 2: 5+ acres, contiguous to Site 1. Site 3: 20+ acres, within 20 mi. radius of Site 2. All sites within 15 mi. of major hwy/housing, within 0.5 mi. of utilities, and above 100 yr. flood plain. Contact Nicole.Lorek@dgs.ca.gov or (916) 375-4042 for more info. Responses due: 4:00 p.m. on 9/23/13.

Online Advertisement (BidSync):

WANTED TO PURCHASE OR LEASE BY THE STATE OF CALIFORNIA
AND THE UNITED STATES FISH AND WILDLIFE SERVICES:
SACRAMENTO – SAN JOAQUIN RIVER DELTA AREA

SITES WANTED: The State of California, Department of Water Resources and the United States Fish and Wildlife Services seek sites for facilities in the Sacramento–San Joaquin River Delta area:

Site 1: Minimum 12 acres within 2 miles proximity to the legal Delta. Waterfront access is essential.

Site 2: Minimum 5 acres, contiguous to Site 1.

Site 3: Minimum 20 acres, within 20 mile radius of Site 2.

All sites should be within 15 miles of major highway/housing; within 0.5 miles of utilities (sewer, power, telecommunications); and above 100 year flood plain.

PERSONS AUTHORIZED TO REPRESENT SUCH PROPERTIES MUST RESPOND TO CONTACT PERSON BY RESPONSE DATE WITH ADDRESS, APN, MAP, PROJECT NUMBER, AND PROJECT NAME BY EMAIL OR IN WRITING.

Project Number:	118478
Project Name:	Delta Facilities
Contact Person:	Nicole Lorek
Email Address:	nicole.lorek@dgs.ca.gov
Address:	Nicole Lorek Department of General Services RESD – RPSS 707 3rd Street – 5th Floor West Sacramento, CA 95605
Phone:	(916) 375-4042
Response Date:	September 23, 2013

APPENDIX B

Level 2 Site Screening Matrix

ERS/FTC Level 2 Site Screening Matrix

Preliminary Site Ranking: Estuarine Research Station (ERS) and Fish Technology Center (FTC)

Site Criteria (*)	Meets Minimum Acreage Requirement (ERS 12 Acre Min) (FTC 5 Acre Min)	Compatible with existing and planned uses for adjacent land	Centrally located within or immediately adjacent (e.g. <2 miles) to the Delta	Located within 15 miles of amenities including housing	Located within 15 miles of major State highway	Located within ½ mile of a municipal wastewater treatment system hookup	Located within ½ mile of reliable power and telecommunications	Waterfront access to a major Delta waterway to provide for 18 slip Marina	Outside the 100-year floodplain (**) and above the mean Sea Level Rise (SLR) for year 2100 "High" in the National Research Council Study on West Coast SLR, and as prescribed in Ocean Protection Council's guidance document	Ground Water Quality	**TOTAL**	**COMMENTS**
LOCATION												
Rio Vista Army Base, Rio Vista	3		3	3	3			3	3	3	**21.0**	
White Slough/ I5, Lodi	2		3	3	3			2	2	2	**17.0**	property location known but high potential of being in 100 year flood designation
Oakley	3		3	3	3			3	2	2	**19.0**	Waterfront is a marsh, 100 year flood designation covers % of Site
South River Road, West Sacramento	3		3	3	3			1	3	2	**18.0**	No direct water front, Long distance for boats to travel in water to work area's
Tyler Island Rd, Isleton	3		3	3	3			1	1	2	**16.0**	No direct water front, Within 100 year flood designation
Canright Road, Rio Vista	3		1	3	3			1	2	2	**15.0**	No waterfront, 100 year flood designation covers % of Site
Wilbur Ave, Antioch	3		3	3	3			3	3	2	**20.0**	
Jefferson Blvd, Clarksburg	3		3	3	3			3	1	2	**18.0**	Waterfront bisected by Hwy 84 (Jefferson Blvd), Within 100 year flood designation
Goosehaven Rd (Between Fairfield and Rio Vista)	3		2	3	3			1	2	2	**16.0**	No waterfront, 100 year flood designation covers % of Site
Ryde Ave, Stockton	3		3	3	3			3	2	2	**19.0**	Long distance for boats to travel in water to work area's, 100 year flood designation covers % of Site
Airport Road Site 1 (32.93 AC), Rio Vista	3		3	3	3			1	3	2	**18.0**	No waterfront
Airport Road Site 2 (57.52 AC), Rio Vista	3		3	3	3			1	3	2	**18.0**	No waterfront

1. Rate on a scale from 1-3 how each "Criteria" satisfies criteria elements for each "Location".

(1 = Fail- Does Not Satisfy, 2 = Unknown , 3 = Pass- Satisfies)

(*) Site criteria in RED was used to provide preliminary site ranking. Other criteria will be looked at under further investigation during environmental review.
(**) Only scored sites effected by 100 year flood, not sea level rise. Sea level rise will be looked at in future investigation.

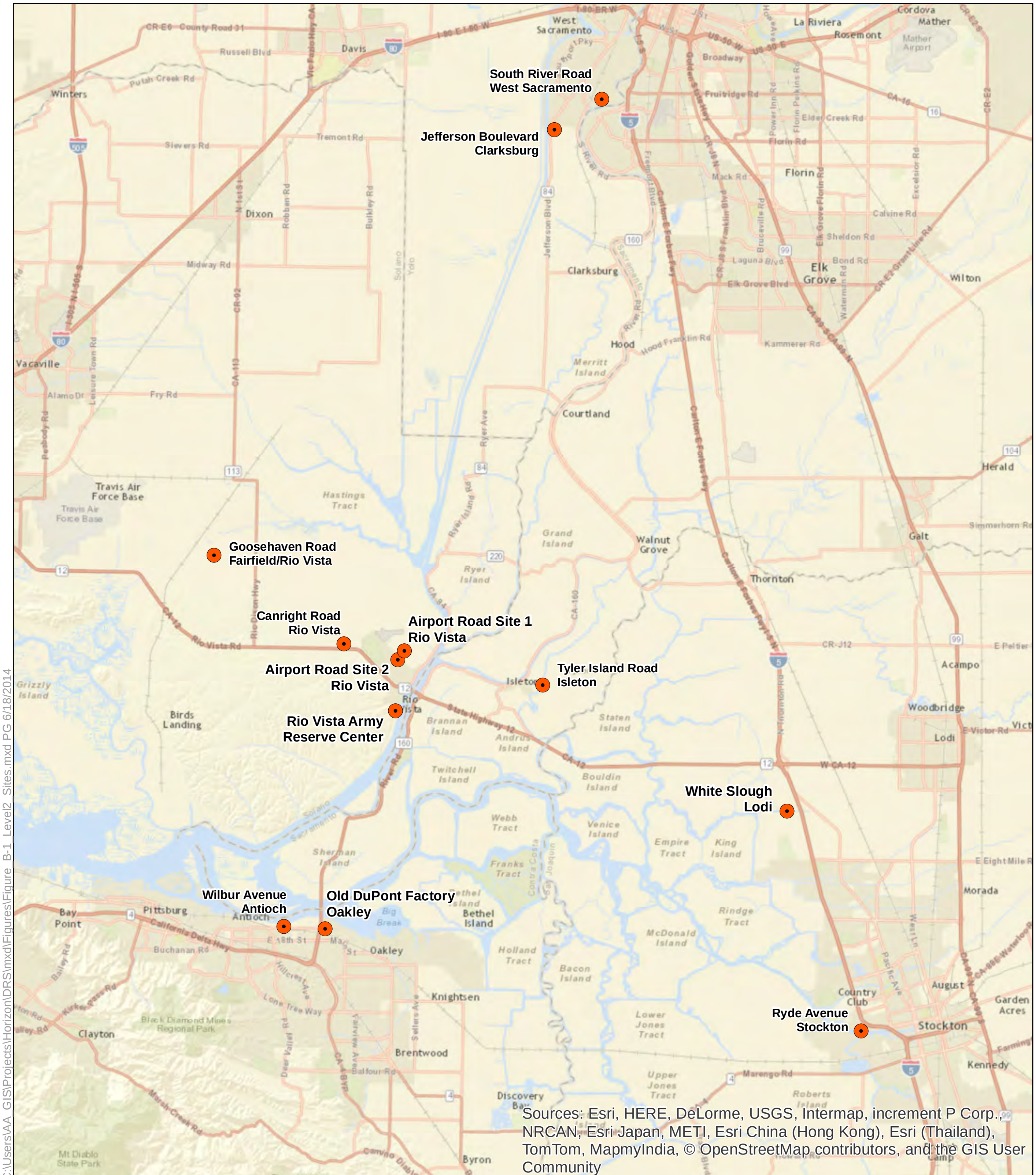

Figure B-1

Level 2 Screening Sites

Horizon WATER and ENVIRONMENT

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APPENDIX C

Screening Results

Rio Vista Army Reserve Center

RIO VISTA ARMY RESERVE CENTER

Summary of Findings

The former Rio Vista Army Reserve Center (RVARC) is 28-acre parcel located within the City of Rio Vista. Figure F-1 provides representative photographs of the site. The screening scores for the RVARC are shown in Table F-1. Overall, this site received a weighted score of 84.25. Explanations for these scores are described by criterion below.

Table C-1. Level 3 Screening Results – Rio Vista Army Reserve Center			
Criterion	**Score**	**Weighting (%)**	**Weighted Score**
1. Compatibility with existing/planned uses for adjacent land	100	0.05	5
2. Access to utilities, including power, sewer, and telecommunications	100	0.05	5
3. Suitability for development of a marina	95	0.15	14.25
4. Centrally Located within IEP Monitoring Region	100	0.15	15
5. Biological resources constraints	50	0.05	2.5
6. Cultural resources constraints	50	0.05	2.5
7. On-site environmental contamination	50	0.10	5
8. Suitability of water supply for facility operations	100	0.15	15
9. Vulnerability to flooding and sea level rise	100	0.15	15
10. Proximity to potential hatchery site	50	0.10	5
		TOTAL	**84.25**

Scoring Explanation

1. Compatibility with Existing/Planned Uses for Adjacent Land

The site is located on the southern edge of the City of Rio Vista. The site is currently vacant and is characterized by physical and economically blighted conditions (City of Rio Vista 2010). Land uses immediately adjacent to the RVARC include a public marina to the north, a U.S. Coast Guard station to the south, agricultural land on the opposite side of Beach Drive to the west, and agricultural land across the Sacramento River to the east. A few single family homes are also located on the opposite side of Beach Drive near the northwest and southwest corners of the site.

The land use designation for the RVARC is “Army Base Reuse Area Special District” in the currently adopted City of Rio Vista General Plan (City of Rio Vista 2001). This designation allows for a mix of land uses and associated intensity/density limitations. The General Plan identifies a reuse program that consists of a combination of public and private uses including the Proposed Project, commercial recreation, public active and passive recreation, recreation serving retail, and ancillary family residential (City of Rio Vista 2010). The City prepared a Draft Environmental Impact Report (EIR) for the Redevelopment Plan for the former RVARC in 2010 (City of Rio Vista 2010). The Draft EIR identified beneficial or less than significant impacts for all land use and planning significance criteria.

The City has also developed Army Base District Design Guidelines (Design Guidelines) that provide guidance for development of this site (MIG 2011). The Design Guidelines apply to all new public and private development at the site. It is anticipated that the Proposed Project would largely comply with the Design Guidelines.

Because no existing or planned land use conflicts were identified, the site received a score of **100**.

2. Access to Utilities, including Power, Sewer and Telecommunications

The RVARC area is served by Pacific Gas and Electric (PG&E) for gas and electricity. The site could be connected to PG&E lines along Beach Drive. According to the Rio Vista Army Base Reuse Plan Final Report, existing on-site utilities are inadequate for future development. Therefore, construction of the FTC/ERS would require on-site sewer, water, and storm drainage improvements. The City of Rio Vista can provide water and sewer from its existing facilities and capacity.

Broadband connections of varying speeds are available via Comcast, Frontier Communications, and Digital Path (CPUC 2013). According to voice and data (4G LTE) coverage maps from Verizon Wireless, AT&T, Sprint, and T Mobile, the RVARC receives both voice and 4G LTE coverage from all four telecommunications service providers.

Based on the proximity to functional utilities, this site was assigned a score of **100**.

3. Suitability for Development of a Marina

This site was scored as follows for the sub-criteria used to identify the overall suitability for development of a marina.

Table C-2. Suitability for Marina Development at the Amy Reserve Center, Rio Vista

Criterion Number	Description	In-Channel Score	Off-Channel Score	Rationale for Score
1a	Waterfront Area Suitability	1	100	Ample amount of waterfront area provides for flexibility in boat launch and marina basin and entrance configurations of an off-channel marina; exposure to wind, waves, and ship traffic make an in-channel basin a sub-optimal configuration.
1b	Backland Support Area Suitability	100	100	Large amount of backland area provides for flexibility in layout of boat storage and other uses.
2	Water Level Variation	100	100	Water level variation at the site does not present any significant challenge to marina design, access to the docks, boat launch ramp design or utilizing the wharf/pier.
3	Accessible Depths	100	100	Depths in excess of those required for the design vessels exist.
4	Site Grading/Excavation Requirements	100	50	Off-channel marina will require some excavation.

Criterion Number	**Description**	**In-Channel Score**	**Off-Channel Score**	**Rationale for Score**
5	Impact of Commercial Traffic	100	100	In-channel or off-channel marina have a low likelihood of being impacted by vessel wake generated by commercial traffic.
6	Sedimentation Potential	100	100	There is a low likelihood that high sedimentation is an issue in the area.
7	Waterborne Debris Potential	100	100	In-channel or off-channel marina has a low likelihood to be impacted by waterborne debris.
8	Flood Hazard Area	100	100	Site is above flood elevations.
9	Marine Services Availability	100	100	High likelihood of marine services being easily provided to the site.
Average		**90**	**95**	

The score for the off-channel marina (95) is used in the ranking because it is assumed that this type of marina could be developed.

4. Centrally Located Within IEP Monitoring Region

The RVARC is centralized within the IEP's monitoring regions (See Figure 6). Therefore, this site received a score of **100**.

5. Biological Resource Constraints

Overview

The RVARC site is predominantly characterized by developed or disturbed upland habitat. The developed areas include buildings, building pads, paved surfaces, and wharfs (Figure C-1). Vegetation in the developed areas is primarily herbaceous, non-native species such as Bermuda grass (*Cynodon dactylon*), old-man-of-spring (*Senecio vulgaris*), and broad leaf filaree (*Erodium botrys*). Native and ornamental trees and shrubs are interspersed throughout the upland areas.

Brackish marsh and riparian habitats exist along the Sacramento River's banks. These areas support herbaceous vegetation such as horsetail (*Equisetum* sp.), rush (*Juncus* sp.), and giant reed (*Arundo donax*), along with woody vegetation such alder (*Alnus* sp.) and willow (*Salix* sp.).

Special-Status Species

Figure C-2 provides a map of species known to occur in the vicinity of the RVARC site. Table C-3 lists special-status species that are known or expected to occur at the RVARC site.

Table C-3. Special-status species known or expected to occur at the RVARC.

Name	Status	Habitat/Location	Data Sources	Comments
Plants				
Suisun marsh aster (*Aster lentus*)	Rare Plant Rank 1B.2	brackish marsh	U.S. Army Corps of Engineers 2000, City of Rio Vista 2010	Species is reported in previous assessments.

Delta tule pea (*Lathyrus jepsonii var. jepsonii*)	Rare Plant Rank 1B.2	brackish marsh	U.S. Army Corps of Engineers 2000, City of Rio Vista 2010	Species was observed during a May 2014 site visit in the vicinity of the existing boat ramp.
Northern California black walnut (*Juglans hindsii*)	Rare Plant Rank 1B.1	Riparian	U.S. Army Corps of Engineers 2000, City of Rio Vista 2010, CNDDB 2014	Species is reported in previous assessments but documentation for identification as the rare, native *Juglans hindsii* is not provivded. CNDDB reports the nearby occurrence of *Juglans hindsii* as extirpated.
Fish				
Steelhead – Central Valley DPS (*Oncorhynchus mykiss)*	Federal Threatened	River/brackish marsh	NMFS and CDFW range maps, CNDDB 2014	Species is present in this portion of the Sacramento River during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
Winter-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Endangered	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Sacramento River during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
Spring-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Threatened	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Sacramento River during seasonal migration periods.
Fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*)	Species of Concern	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Sacramento River during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
Green sturgeon (*Acipenser medirostris*)	Federal Threatened	River	NMFS range maps	Species may be present in this portion of the Sacramento River year-round. Spawning occurs further upstream.
Delta smelt *Hypomesus transpacificus*	Federal and State Threatened	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Sacramento River year-round.
Longfin smelt (*Spirinchus thaleichthys*)	State Threatened	River/brackish marsh	USFWS and CDFW range maps, CNDDB 2014	Species may be present in this portion of the Sacramento River year-round.
Sacramento splittail (*Pogonichthys macrolepidotus*)	State Species of Concern	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Sacramento River year-round
Pacific lamprey (*Lampetra tridentate*)	USFWS Species of Concern	River	USFWS range map	Species is present in this portion of the Sacramento River during seasonal migration periods.
Reptiles				
Western pond turtle (*Actinemys marmorata*)	State Species of Concern	River/brackish marsh/riparian	U.S. Army Corps of Engineers 2000, City of Rio Vista 2010	Species is reported in previous assessments.
Birds				
Tricolored blackbird (*Agelaius tricolor*)	State Species of Concern	Brackish marsh/riparian	U.S. Army Corps of Engineers 2000, City of Rio Vista 2010	Species is reported in previous assessments. Species is not expected to nest on site.

Swainson's hawk (*Buteo swainsoni*)	State Threatened	Riparian/upland	CNDDB 2014	Species occurs in close proximity to the site. Site provides marginally suitable nesting sites and low quality foraging habitat.
Song sparrow (*Melospiza melodia*) ("Modesto" population)	State Species of Concern	Brackish marsh/riparian	CNDDB 2014	Species occurs in close proximity to the site. Shoreline area provides suitable nesting and foraging habitat.
Mammals				
Townsend's big-eared bat (*Corynorhinus townsendii*)	State Species of Concern	River/brackish marsh/riparian	U.S. Army Corps of Engineers 2000, City of Rio Vista 2010	Suitable habitat is present, but no evidence of bats use has been observed.

Wetlands and Waters of the U.S.

Figure C-3 provides a map of wetlands and waters from the National Wetlands Inventory (NWI) (USFWS 2010). The NWI maps the Sacramento River as "Riverine" and it is considered Traditionally Navigable Waters under the Clean Water Act (CWA). Riparian areas and brackish marsh along the banks of the river that are not mapped by NWI would be considered jurisdictional wetlands under the CWA. No wetlands or other waters were observed elsewhere on the site during a May 2014 reconnaissance survey.

Summary of Constraints and Ranking

Development at the RVARC would mostly occur in upland, disturbed areas that are not likely to support special-status species. Trees and other woody vegetation in upland areas provide suitable nesting habitat for raptors and migratory passerines. Impacts to nesting birds could be avoided or minimized by limiting construction to seasonal work periods, establishing buffers, or removing nesting habitat outside of the nesting season. Structures and large trees on the site also provide suitable roosting habitat for bat species, but their presence has not been observed.

The Sacramento River and adjacent brackish marsh habitat support several special-status fish species that are associated with the Delta ecosystem. Impacts to fish could be minimized by limiting construction work periods to avoid seasonal migrations and spawning periods for most species.

Freshwater marsh habitat on the shoreline supports western pond turtle (*Actinemys marmorata*), a population of Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*), and possibly other special-status plants and birds associated with this habitat type. The ability for site development to avoid impacts to this habitat type and these species is not known at this time.

In summary, ERS/FTC development would be focused in disturbed areas that are not likely to support special-status species or wetlands. Potential impacts to several special-status fish species during development of a boat ramp and marina are considered common among all ERS/FTC sites. However, development along the shoreline has the potential to impact sensitive habitats, wetlands, and a known population of a special-status plant species (i.e., Delta tule pea). Therefore, this site received a score of **50**. A lower score is not warranted because the area of sensitive habitat/wetlands that would likely be impacted is relatively small.

6. Cultural Resources Constraints

This property sits within a former wetland area shown on the 1910 Rio Vista USGS 7.5' topographic map along the Sacramento River. At some point between 1910 and 1919 the wetland was reclaimed and a large amount of fill was brought to the site area. Between 1919 and 1944 it was used by the U.S. Army Corps of Engineers (USACE) as the primary staging area for the construction of levees in the Delta as part of the Sacramento River Flood Control Project. Numerous buildings were constructed to support this effort. Aerial photography indicates continuous improvements were made on the property until 1970. The buildings were grouped into a historic district, the U.S. Engineer Storehouse Historic District, and recommended as eligible for the National Record of Historic Places (NRHP) by JRP Consultants in the late 1990s (JRP 1997). However, the USACE did not agree with the NRHP eligibility recommendation for the district, and USACE's determination was supported by the State Historic Preservation Office (SHPO). Since the late 1990s, several structures have been removed, and others have fallen into disrepair or have collapsed.

Four previously recorded historic resources were identified within 0.25 miles of the site area:

P-48-916 Described as an "old railway pier," it is not considered historically significant.

P-48-917 A well-preserved 200+ foot wreck of a historic-era steamboat. Further evaluation would only be necessary if the resource has potential to be impacted by the Project.

P-48-938 A possible shipwreck, it is considered historically insignificant but further evaluation is recommended if the resource has potential to be be impacted by the Project.

P-48-951 Debris, possibly a vessel, located in 8 feet of water near the shoreline.

P-48-953 A possible shipwreck, though further evaluation is recommended if the resource has potential to be impacted by the Project.

Prehistorically, the property sits roughly two miles south of the Anizumne village. It is within ethnographic Plains Miwok territory but is also near Bay Miwok and Patwin territory. Similar to other areas on the Sacramento River, there would have been an abundance of riparian flora and fauna. The area would have been occasionally inundated due to natural flooding (Bennyhoff 1977). There are no known prehistoric resources within 0.25 mile of the property.

One cultural resource study, resulting in the identification of the historic district described above, has been conducted within the site area:

S-29351 Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, Solano County, California.

The historic-era buildings on the property will need to be evaluated under CEQA; however, because SHPO has previously determined that they are not significant, any impacts under CEQA would not be anticipated to be considered significant. Prehistoric resources are unlikely to be encountered in the vicinity of the buildings due to the regular inundation of the area prehistorically and to the fill added to the property in the historic-era. The upland areas on the west side of the parcel would have bordered the natural course of the river and would have been suitable for habitation during the prehistoric era. Early topographic maps depict the eastern portion of the parcel as marshland and as such would not have been suitable for long-term human occupation during the prehistoric era.

The site received a score of **50** because of the potential for prehistoric era resources in the western portion of the site.

7. On-site Environmental Contamination

According to the Environmental Data Resources (EDR) Database Report, the subject property is listed on the leaking underground storage tank (LUST) and military cleanup sites (MCS) databases where its status is identified as “completed – case closed.” The subject property is listed on the RESPONSE, ERNS, LUST, HIST-Cal sites, CDL, CA Cortese, MCS, and CHMIRS, and is considered an historical Recognized Environmental Condition (HREC). An HREC is defined as a past release of any hazardous substance or petroleum hydrocarbons that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting the unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.

Sixteen LUST sites were identified in the databases, of which one site is on the subject property and another is located on an adjoining site (Delta Marine Yacht Club). Both sites were identified as “completed – case closed.” Eight sites with registered underground storage tanks (USTs) were identified in the databases, of which one site is the subject property and another is located on an adjoining site (Delta Marine Yacht Club). Five sites were identified in the databases indicating releases. The closest site is 0.126 miles north-northwest of the site (PG&E).

Based on the review of the aerial photographs (1937, 1952, 1957, 1965, 1970, 1984, 1993, 1998, 2005, 2006, 2009, 2010, and 2012) and topographic maps (1910, 1952, 1953, 1968, 1978, and 1993), the subject property was shown to be undeveloped on the 1910 topographic map. However, in the 1937 aerial photograph, the subject property was shown to be developed. The subject property is located in a light commercial and residential area. Continuous improvements were observed on the subject property during each period between 1937 until 1970 where additional structures are shown on the aerial photographs. Aerial photographs taken after 1970 show the absence of some structures at the subject property. Due to the age of the buildings located on the subject property, there is a high probability that lead based paint exists; as described below, asbestos-containing materials also exist at the site.

According to the EDR Database Report, the subject property was not identified in the EDR database search. However, one site on an adjoining property was identified on the LUST database. The status of this site was identified as “completed – case closed.” This site is identified as a Recognized Environmental Condition (REC), but may be re-identified as a HREC if the property meets the unrestricted use criteria.

The Draft Environmental Impact Report Rio Vista Army Reserve Center Redevelopment Plan (Rio Vista, 2011) provides the following information:

- Soil contamination exceeding screening levels was identified in several of the areas of investigation. These soils were removed and properly disposed offsite. Soil analytical data for remaining soil indicate that remaining soil contamination does not warrant further investigation or removal actions.
- A water quality assessment was performed to evaluate water quality and the potential for impacts to groundwater to the site and river surface water adjacent to the site. The conclusions in the assessment stated that, despite the modeled theoretical risk, these residual contaminants do not represent a substantial risk to groundwater quality that warrants further investigations or removal actions.
- Asbestos surveys were completed in 1989 and 1998. The results of the surveys showed that the majority of the asbestos-containing materials were in a non-friable state and did not pose an imminent health threat so were left in place.
- No records were found of lead-based paint surveys conducted at the site. However, it was documented that soil lead contamination from boat maintenance and repainting activities involving lead-based paint was cleaned up as part of the soil remediation activities.

This site received a ranking of **50** due to the potential of asbestos-containing materials and lead-based paint remaining at the site as well as the uncertainty that the investigations completed at the site had identified all contamination at the site.

8. Suitability of Water Supply for Facility Operations

The former RVARC is located in the Solano Subbasin, which is located within the larger Sacramento Valley Groundwater Basin, in the counties of Solano, Sacramento, and Yolo. DWR's Bulletin 118 (DWR 2006) lists the Solano Subbasin as groundwater basin number 5-21.66.

Groundwater within the Solano subbasin is considered to be of generally good quality. Chemical water types within the southern area of this basin is classified sodium bicarbonate. Total dissolved solids (TDS) are found at levels higher than 500 mg/L in the southern area. Evaluation of data from the Department of Health Services shows the TDS minimum to be 150 mg/L, maximum to be 880 mg/L, and average of 427 mg/L. Neither the site itself, nor adjacent properties, are listed in the state's Geotracker database for active sites of groundwater contamination, and the site's groundwater is not contaminated as a result of land uses at the former RVARC.

Well yields are reported in the thousands of gallons per minute (GPM) in the Tehama Formation, the primary water-bearing formation in Rio Vista. Although no studies have yet quantified the basin's sustainable yield, groundwater supplies are believed adequate to meet and exceed the current groundwater demands in the basin, and the DWR does not consider the basin to be in overdraft.

Parameter	Determination

Flow/Quantity	Groundwater wells should be able to produce sufficient yields, and groundwater storage is considered satisfactory.
Salinity	Salinity levels should be within acceptable ranges.

Due to sufficient quantity, yields, and salinity, this site received a **100** for this criterion.

9. Vulnerability to Flooding and Sea Level Rise

Figure C-4 shows the FEMA Special Flood Hazard Area (i.e., 100-year flood zone) and MHHW +55-inch SLR. The figure shows that a small portion of the site near the existing boat ramp is within the 100-year flood zone. Likewise, this area would be subject to inundation under the MHHW +55-inch SLR scenario (Figure C-4). Sufficient area exists to develop ERS/FTC facilities outside of the 100-year flood zone and areas that are vulnerable to SLR. Therefore, this site received a score of **100**.

10. Proximity to Potential Hatchery Site

The RVARC site cannot accommodate both an ERS/FTC and a Hatchery. However, an available site that could accommodate the Hatchery is located on Airport Road in Rio Vista, approximately 4 miles from the RVARC. Therefore, this site received a score of **50**.

References

Bennyhoff, James A., 1977. Ethnogeography of the Plains Miwok. Center for Archaeological Research at Davis, Publication Number 5, Davis, California.

California Department of Water Resources (DWR). 2006. California's Groundwater, Bulletin 118. http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm. Accessed: June 18, 2014

California Department of Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service (DWR et al.). 2013. Draft Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan. November. (ICF 00674.12.) Prepared by ICF International, Sacramento, CA.

California Natural Diversity Data Base (CNDDB). 2014. California Department of Fish and Wildlife, Biogeographic Data Branch. Sacramento, California. June 2014 update

California Public Utilities Commission (CPUC). 2013. California Broadband Availability. Available at: http://www.broadbandmap.ca.gov/map/. Accessed on March 12, 2014

City of Rio Vista. 2001. General Plan 2001. Prepared by the City of Rio Vista Community Development Department. Available at: http://riovistacity.com/general-plan/ . Accessed June 18, 2014.

City of Rio Vista. 2010. Draft Environmental Impact Report, Rio Vista Army Reserve Center Redevelopment Plan. State Clearinghouse #2010012028. Prepared by the City of Rio Vista. Available at: http://riovistacity.com/army-base-ed/ . Accessed May 29, 2014.

City of Rio Vista. 2011. Final Environmental Impact Report, Rio Vista Army Reserve Center Redevelopment Plan. State Clearinghouse #2010012028. Prepared by the City of Rio Vista. Available at: http://riovistacity.com/army-base-ed/ . Accessed May 29, 2014.

JRP Historical Consulting Services, 1997. Evaluation of National Register Eligibility, Rio Vista Army Reserve Center, Rio Vista, Solano County, California. On file at the Central California Information Center, California State University, Stanislaus.

MHW. 2008. Technical Memoranda No. 1: Delta Smelt Hatchery Water Quality and Water Treatment Conceptual Evaluation. Prepared for U.S. Fish and Wildlife Service. July.

MIG. 2011. Army Base District Guidelines, City of Rio Vista. June 2011.

U.S. Army Corps of Engineers. 2000. Final Environmental Assessment for Disposal and Reuse of Rio Vista Army Reserve Center, California.

U.S. Fish and Wildlife Service (USFWS). 2010. National Wetlands Inventory database. Retrieved online on June 2014 at: http://www.fws.gov/wetlands

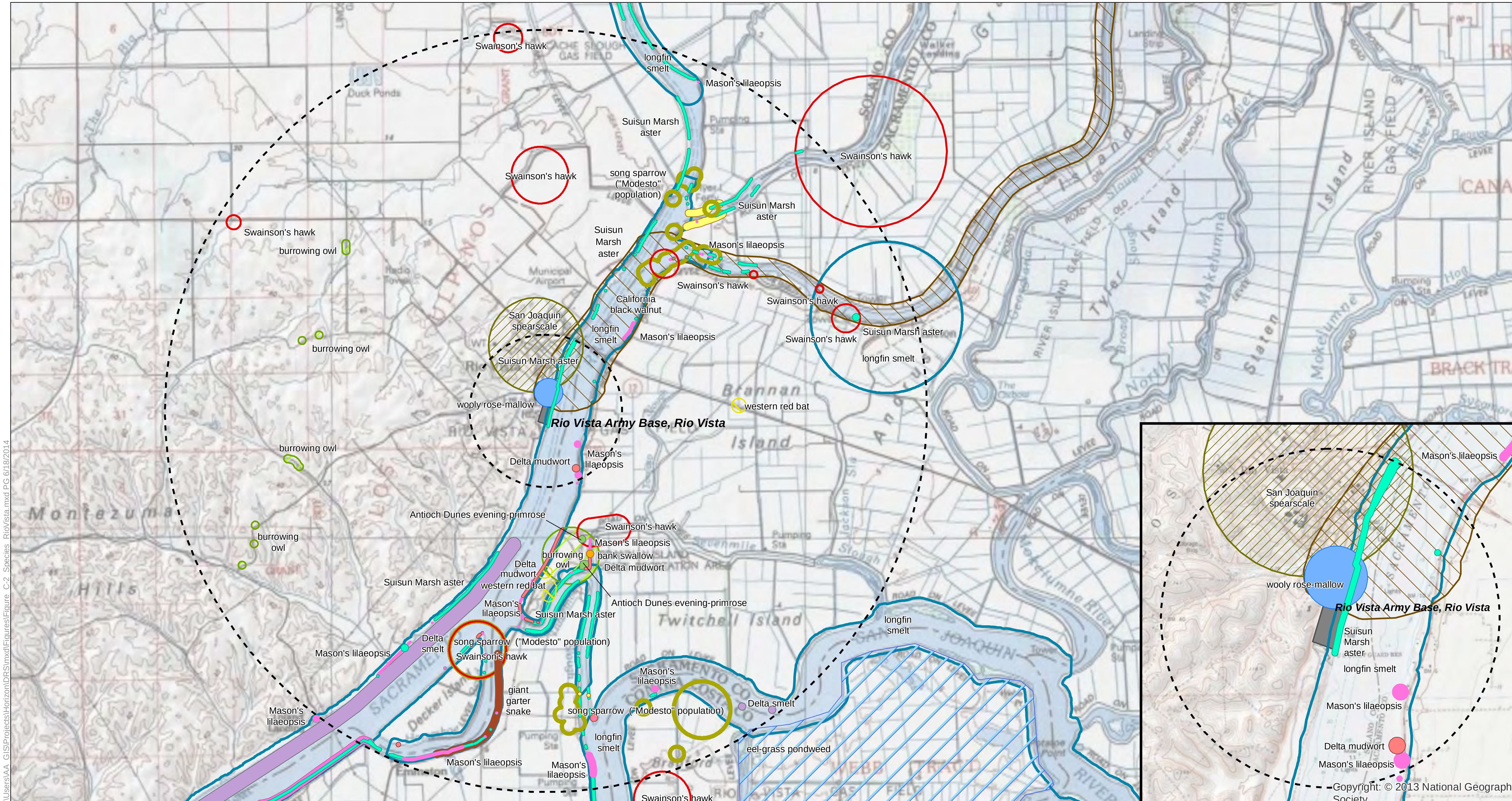
Figure C-1. Photographs of the Rio Vista Army Reserve Center

Photo No. 1	Date: 5/7/2014
Description: Existing boat ramp	

Photo No. 2	Date: 5/7/2014
Description: Existing wharf	

Photo No. 3	Date: 5/7/2014
Description: Typical conditions in the lower bench (eastern portion of site)	

Photo No. 4	Date: 5/7/2014
Description: Typical conditions in the upper bench (western portion of site)	



N
0 1 2
Miles

Horizon WATER AND ENVIRONMENT

- Antioch Dunes evening-primrose
- Delta mudwort
- Delta smelt
- Delta tule pea
- Mason's lilaeopsis
- Northern California black walnut
- San Joaquin spearscale
- Sanford's arrowhead
- Suisun Marsh aster
- Swainson's hawk
- bank swallow
- burrowing owl
- eel-grass pondweed
- giant garter snake
- longfin smelt
- mountain plover
- song sparrow ("Modesto" population)
- western red bat
- woolly rose-mallow
- Site Parcels
- 1-Mile and 5-Mile site radii

Figure C-2

Special Status Species Occurrences in the Vicinity of the Rio Vista Army Reserve Center

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N

0 0.125 0.25
Miles

NWI Wetlands and Waters Types

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Site Parcels

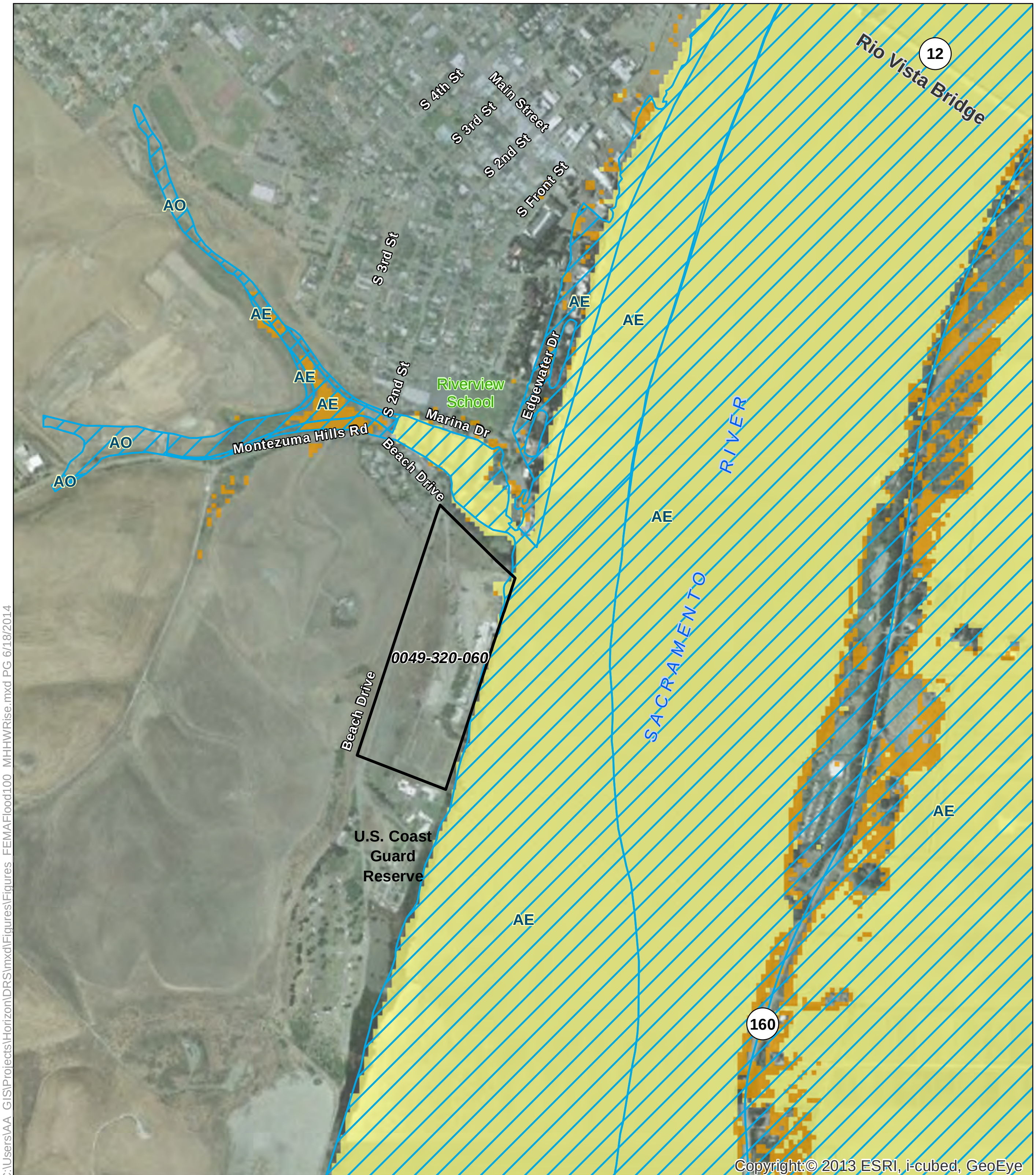
Source: U.S. Fish & Wildlife Service, 2010

Figure C-3

National Wetland Inventory Map for the Rio Vista Army Reserve Center

Horizon Water and Environment

C:\Users\AA GIS\Projects\Horizon\DRS\mxd\Figures\Figures NWIInventory.mxd PG 6/18/2014



N

0 0.125 0.25

Miles

Horizon WATER and ENVIRONMENT

100-Year Flood Zone

Zone AE Base Flood Elevations determined.
Zone AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

Site Parcels

Existing Area at or below MHHW

Potential Additional Area at or below MHHW with 55" Sea Level Rise

Flood zone source: FEMA, 2009; 2012; 2013; 2014
Tidal depths source: URS, 2008

Figure C-4

Flood and Sea Level Rise Risk Analysis for the Rio Vista Army Reserve Center

APPENDIX D

Screening Results

845 Ryde Avenue, Stockton

845 RYDE AVENUE, STOCKTON

Summary of Findings

The 845 Ryde Avenue site is comprised of six parcels totaling 35.11 acres located within the City of Stockton. Figure D-1 provides representative photographs of the site. The screening scores for 845 Ryde Avenue are shown in Table D-1. Overall, this site received a weighted score of 66.3. Explanations for these scores are described by criterion below.

Table D-1. Level 3 Screening Results – 845 Ryde Avenue, Stockton

Criterion	Score	Weighting (%)	Weighted Score
1. Compatibility with existing/planned uses for adjacent land	100	0.05	5
2. Access to utilities, including power, sewer, and telecommunications	100	0.05	5
3. Suitability for development of a marina	90	0.15	13.5
4. Centrally Located within IEP Monitoring Region	1	0.15	0.15
5. Biological resources constraints	100	0.05	5
6. Cultural resources constraints	50	0.05	2.5
7. On-site environmental contamination	100	0.10	10
8. Suitability of water supply for facility operations	1	0.15	0.15
9. Vulnerability to flooding and sea level rise	100	0.15	15
10. Proximity to potential hatchery site	100	0.10	10
		TOTAL	**66.3**

Supporting Information

1. Compatibility with Existing/Planned Uses for Adjacent Land

Land within the site is designated as Commercial in the City of Stockton's General Plan (City of Stockton 2014a). This designation allows for land uses such as retail, business, medical and professional offices, residential uses, public and quasi-public uses and other similar and compatible uses (City of Stockton 2007). Land adjacent to the site to the south (i.e., the shoreline) is designated as Parks and Recreation. Land to the north is designated primarily as Low and Medium Density Residential. Land to the east and west is designated commercial (City of Stockton 2014a).

The site is zoned as Industrial-General and Industrial-Limited by the City of Stockton (City of Stockton 2014b). Allowable land uses within the Industrial-General Zoning District include agricultural activities and facilities, business support services, light and heavy manufacturing, research and development, and warehouses (City of Stockton 2014c). The Industrial Limited District allows for similar uses as Industrial-General with the notable exception that heavy manufacturing is not permitted (City of Stockton 2014c). Land adjacent to the site to the north and east is zoned as Residential-Low-Density, Industrial-Limited, and Residential-Medium Density (City of Stockton 2014b).

No apparent land use conflicts were identified. Therefore, this site received a score of **100** for this criterion.

2. Access to Utilities, including Power, Sewer and Telecommunications

All major utilities major (electric, gas, water) are available at the site's boundaries. PG&E would provide electricity and gas. The site receives water and wastewater services from Cal Water and the City of Stockton, respectively. Broadband connections of varying speeds are available via Comcast and AT&T (CPUC 2013). The site receives full voice coverage and receives full data coverage from: Verizon 4G LTE, AT&T 4G LTE, Sprint 3G, T-Mobile 4G LTE (all according to each service provider's coverage map).

Based on the proximity to functional utilities, this site was assigned a score of **100**.

3. Suitability for Development of a Marina

This site was scored as follows for the sub-criteria used to identify the overall suitability for development of a marina. An in-channel marina is not proposed because channel width would limit marina development to side ties along the marginal wharf.

Table D-2. Suitability for Marina Development at 845 Ryde Avenue, Stockton

Criterion No.	Description	Off-Channel Score	Rationale for Score
1a	Waterfront Area Suitability	100	Ample amount of waterfront area provides for flexibility in boat launch and marina basin and entrance configurations.
1b	Backland Support Area Suitability	100	Large amount of backland area provides for flexibility in layout of boat storage and other uses.
2	Water Level Variation	100	Water level variation at the site does not present any significant challenge to marina design, access to the docks, boat launch ramp design or utilizing the wharf/pier.
3	Accessible Depths	100	Depths in excess of those required for the design vessels exist.
4	Site Grading/Excavation Requirements	50	Off-channel marina will require some excavation.
5	Impact of Commercial Traffic	50	High commercial traffic associated with Port of Stockton creates a moderate likelihood that marina will be impacted by vessel wake.
6	Sedimentation Potential	100	There is a low likelihood that high sedimentation is an issue in the area.
7	Waterborne Debris Potential	100	Off-channel marina has a low likelihood to be impacted by waterborne debris.
8	Flood Hazard Area	100	Site is above flood elevations.
9	Marine Services Availability	100	High likelihood of marine services being easily provided to the site
Average		**90**	

4. Centrally Located within IEP Monitoring Area

This site is located along the southeastern periphery of the IEP monitoring region (See Figure 6). As such, it is not considered to be centrally located. Therefore, this site received a score of **1** for this criterion.

5. Biological Resources Constraints

Nearly the entire site is uplands that have been previously disturbed for industrial use. During the May 2014 site reconnaissance, large portions of the site were characterized by bare ground or gravel (Figure D-1). Vegetation in the developed areas included herbaceous species such as yellow star-thistle (*Centaurea solstitialis*), wild oats (*Avena fatua*), and Italian ryegrass (*Festuca perennis*). The banks of the San Joaquin River are riprapped. Vegetation along the shoreline is sparse with the exception of the walnut trees (*Juglans sp.*) planted at the top of bank.

Special-Status Species

Figure D-2 provides a map of species known to occur in the vicinity of the site. Table D-3 lists special-status species that are known or expected to occur at the site.

Table D-3. Special-status species known or expected to occur at the 845 Ryde Avenue site.

Name	Status	Habitat/Location	Data Sources	Comments
Fish				
Steelhead – Central Valley DPS (*Oncorhynchus mykiss)*	Federal Threatened	River/brackish marsh	NMFS and CDFW range maps, CNDDB 2014	Species is present in this portion of the San Joaquin River during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
Spring-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Threatened	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the San Joaquin River during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
Fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*)	Species of Concern	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the San Joaquin River during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
Green sturgeon (*Acipenser medirostris*)	Federal Threatened	River	NMFS range maps	Species is present in this portion of the San Joaquin River during seasonal migration periods.
Delta smelt *Hypomesus transpacificus*	Federal and State Threatened	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Sacramento River year-round.
Longfin smelt (*Spirinchus thaleichthys*)	State Threatened	River/brackish marsh	USFWS and CDFW range maps, CNDDB 2014	Species may be present in this portion of the Sacramento River year-round
Sacramento splittail (*Pogonichthys macrolepidotus*)	State Species of Concern	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Sacramento River year-round

Name	Status	Habitat/Location	Data Sources	Comments
Pacific lamprey (*Lampetra tridentate*)	USFWS Species of Concern	River	USFWS range map	Species is present in this portion of the Sacramento River during seasonal migration periods.
river lamprey (*Lampetra ayresii*)	State Species of Concern	River	CDFW range map	Adults present in this portion of the Sacramento River during seasonal migration periods. Early life stages may be present year-round.
Birds				
Swainson's hawk (*Buteo swainsoni*)	State Threatened	Riparian/upland	CNDDB 2014	Species occurs in close proximity to the site. Site provides low quality foraging habitat.

Wetlands and Waters of the U.S.

Figure D-3 provides a map of wetlands and waters from the NWI (USFWS 2010). The NWI maps the San Joaquin River/Deep Water Channel as "Riverine" and it is considered Traditionally Navigable Waters under the CWA. No wetlands or other waters were observed elsewhere on the site during a May 2014 reconnaissance survey.

Summary of Constraints and Ranking

Development at the Ryde Ave site would mostly occur in upland, disturbed areas that are not likely to support special-status species. Trees along the margins of the property provide suitable nesting habitat for migratory passerines. Impacts to nesting birds could be avoided or minimized by limiting construction to seasonal work periods, establishing buffers, or removing nesting habitat outside of the nesting season.

The San Joaquin River supports several special-status fish species that are associated with the Delta ecosystem. Impacts to fish could be minimized by limiting construction work periods to avoid seasonal migrations and spawning periods for most species.

In summary, ERS/FTC development would be focused in disturbed areas that are not likely to support special-status species or wetlands. Potential impacts to several special-status fish species during development of a boat ramp and marina are considered to be common among all sites. Therefore, this site received a score of **100**.

6. Cultural Resources Constraints

Information from the on-site environmental contamination screening (see criterion 7) indicated that the parcels had experienced some limited development from 1957 to 1975 and, more recently were used as staging ground for construction of the new Bay Bridge. There is some indication that several feet of fill soils have been placed over the parcels possibly burying native soils and archaeological resources. One historic-era resource is within 0.25 miles of the site, across the canal on Rough and Ready Island:

P-39-049 The Albert Lindley House is the former residence of the commander of the decommissioned Naval Base located on Rough and Ready Island.

The area is within the ethnographic territory of the Northern Yokuts peoples. Though no known prehistoric resources are within 0.25 miles of the properties, two major prehistoric resources with human remains exist 1.6 miles to the east along the channel. The Project area sits near the confluence of the channel and Mormon Slough. Tule elk, pronghorn antelope, and various species of fish and waterfowl would have been abundant along the river. Dense vegetation covered the riverbanks (Wallace 1978).

Two previous cultural resource studies, both with negative results, have been conducted within portions of the site:

SJ-766	Cultural Resource Reconnaissance of the EIR-801 Sohio Project, City of Stockton, San Joaquin County, California.
SJ-1542	Cultural Resource Assessment of the North Stockton Interceptor, San Joaquin County, California.

Though this site appears to have little historic-era significance, the presence of a large Native American village with human remains 1.6 miles east along the same water way, as well as the positioning of the site at the confluence of the San Joaquin River and what is likely a natural distributary, the Burns Cutoff, indicates a heightened sensitivity for sub-surface deposits within the site. For these reasons, this site received a score of **50.**

7. On-site Environmental Contamination

The subject property was not identified in the EDR database search. Twenty-seven LUST database sites were identified in the databases, of which one site was identified on an adjoining site (Local Food Market). This site was identified as "completed – case closed." Thirteen sites with registered USTs were identified in the databases, of which two sites were identified on an adjoining site (Pacific Storage Company and Local Food Market). Twenty-eight surrounding sites were identified in the databases indicating releases. The closest site is 0.304 miles south-southwest of the site (Rice Terminals).

Based on the review of the aerial photographs and topographic maps, the site appears undeveloped on the 1937 aerial photograph. The site is located in a light commercial and residential area. The site appears to have a few structures with some limited development from 1957 through 1975. No structures are shown at the subject property on the 1982 aerial photograph. The site was used for fabrication of bridge decking for the Bay Bridge. The 2005 aerial photograph shows approximately 100 structures that are assumed to be bridge decking, each 30 feet by 100 feet. The number of deckings shown on the 2006 aerial photograph decreases to approximately 30. The 2009 and 2010 aerial photographs show the subject property to be undeveloped.

According to the EDR Database Report, the subject property was not identified in the EDR database search. However, one site on an adjoining property was identified on the LUST database. The status of this site was identified as "completed – case closed." This site is identified as a REC, but may be re-identified as a HREC if the property meets the unrestricted use criteria. An HREC is defined as a past release of any hazardous substance or petroleum hydrocarbons that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting the unrestricted use criteria established by a regulatory authority, without subjecting the property to any required controls.

Because the site has no known contamination, it received a score of **100**.

8. Suitability of Water Supply for Facility Operations

This site overlies the San Joaquin Valley Groundwater Basin (Eastern San Joaquin Subbasin). The Eastern San Joaquin Subbasin is bounded by the Mokelumne River on the north and northwest, the San Joaquin River on the west, the Stanislaus River on the south, and consolidated bedrock on the east. DWR lists the Basin as groundwater basin number 5-22.01 (DWR 2006).

The majority of the groundwater in the basin is characterized by calcium-magnesium bicarbonate or calcium-sodium bicarbonate types. Large areas of chloride-type water occur along the western margin of the subbasin along the San Joaquin River. Based on analyses of 174 water supply wells in the subbasin, TDS ranges from 30 to 1,632 mg/L and averages about 310 mg/L. TDS ranged from 50 to 3,520 mg/L with a mean of 463 and median of 269. As a result of declining water levels, poor quality water has been moving east along a 16-mile front on the east side of the Delta. The degradation was particularly evident in the Stockton area where the saline front was moving eastward at a rate of 140 to 150 feet per year. Data from 2006 indicate that the saline front underlying the City of Stockton has encroached further eastward under the City (Eastern San Joaquin County Groundwater Basin Authority 2014).

Neither the site itself, nor adjacent properties, are listed in the state's Geotracker database for groundwater contamination.

The groundwater basin is in a state of extreme overdraft, with an estimated 70,000 acre-feet of recharge needed annually to stabilize groundwater levels, and 140,000 acre-feet needed annually to return the aquifer to its historic levels. DWR estimates that the Laguna Formation can produce an average yield of 900 GPM, and up to 1,500 GPM (DWR 2006).

Parameter	Determination
Flow/Quantity	Groundwater wells should be able to produce sufficient yields for initial needs but would not be sufficient for eventual water needs. In addition, such pumping would contribute substantially to existing overdraft conditions. For this reason, groundwater supplies are not considered sufficient or reliable for use at the FTC.
Salinity	While a saline front has advanced under the location of the site, reducing its suitability for potable supplies, the salinity of the groundwater is still likely within the acceptable range for FTC operations.

Because of the lack of adequate groundwater supply and insufficient yields at this site, it received a score of **1** for this criterion.

9. Vulnerability to Flooding and Sea Level Rise

Figure D-4 shows the FEMA Special Flood Hazard Area (i.e., 100-year flood zone) and the MHHW +55-inch SLR. The figure shows that the northern portion of parcel 133-060-006 is in the 100-year flood zone. The data also show that the shoreline area would be subject to inundation under the MHHW +55-inch SLR scenario (Figure D-4). It is anticipated that the site has sufficient area to develop the ERS/FTC outside of the 100-year flood zone and areas that are vulnerable to SLR. Therefore, this site received a score of **100**.

10. Proximity to a Potential Hatchery Site.

This site can accommodate both the ERS/FTC and a Hatchery. Therefore, this site received a score of **100**.

References

California Department of Water Resources (DWR). 2006. California's Groundwater, Bulletin 118. http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm. Accessed: June 18, 2014

California Department of Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service (DWR et al.). 2013. Draft Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan. November. (ICF 00674.12.) Prepared by ICF International, Sacramento, CA.

California Natural Diversity Data Base (CNDDB). 2014. California Department of Fish and Wildlife, Biogeographic Data Branch. Sacramento, California. June 2014 update

California Public Utilities Commission (CPUC). 2013. California Broadband Availability. Available at: http://www.broadbandmap.ca.gov/map/. Accessed on March 12, 2014

City of Stockton. 2007. Stockton General Plan 2035: Goals and Policies Report. Available: http://www.stocktongov.com/files/GoalPolicyReport.pdf. Accessed March 14, 2007.

City of Stockton. 2014a. General Plan Map. Available: http://www.stocktongov.com/government/departments/communityDevelop/genPlanMap.html Accessed March 14, 2014.

City of Stockton. 2014b. Zoning Map. Available: http://www.stocktongov.com/government/departments/communityDevelop/zoningMap.html Accessed March 14, 2014.

City of Stockton. 2014c. Stockton Municipal Code, Charter, and Civil Service Rules, Title 16 Development Code, Division 2. Zoning Districts, Allowable Land Uses, and Zone-Specific Standards, Chapter 16.20 Allowable Land Uses and Permit Requirements. Available: http://qcode.us/codes/stockton/view.php?topic=16-2-16_20-16_20_020&frames=on. Accessed March 14, 2014.

Eastern San Joaquin County Groundwater Basin Authority, 2014. 2014 Eastern San Joaquin Integrated Regional Water Management Plan. http://www.gbawater.org/IRWMP%20Update.html. Accessed: June 18, 2014

U.S. Fish and Wildlife Service (USFWS). 2010 National Wetlands Inventory database. Retrieved online on June 2014 at: http://www.fws.gov/wetlands

Wallace, William J., 1978. Northern Valley Yokuts. In California*, Handbook of North American Indians*, Vol 8:462-470, edited by R.F. Heizer. Smithsonian Institution Press, Washington, D.C.

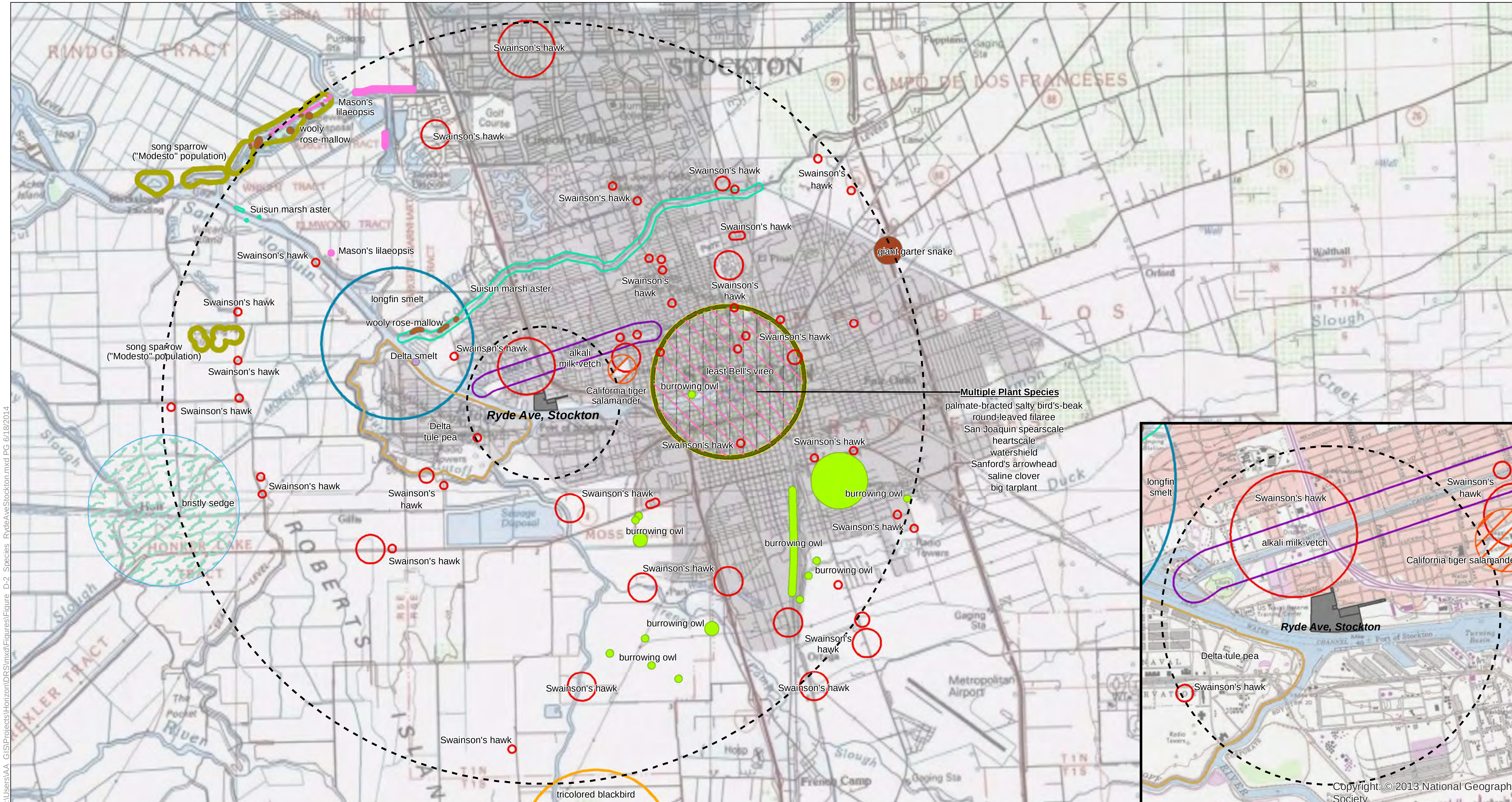
Figure D-1. Photographs of 845 Ryde Avenue, Stockton

Photo No. 1	Date: 5/7/2014
Description: Typical conditions in portions of the site with gravel/ bare ground	

Photo No. 2	Date: 5/7/2014
Description: Typical conditions in portions of the site with ruderal vegetation	

Photo No. 3	Date: 5/7/2014
Description: Typical conditions along the shoreline (looking east)	

Photo No. 4	Date: 5/7/2014
Description: Typical conditions along the shoreline (looking west)	



N

0 1 2
Miles

Horizon WATER AND ENVIRONMENT

- California tiger salamander
- Delta smelt
- Delta tule pea
- Mason's lilaeopsis
- San Joaquin spearscale
- Sanford's arrowhead
- Suisun Marsh aster
- Swainson's hawk
- alkali milk-vetch
- big tarplant
- bristly sedge
- burrowing owl
- giant garter snake
- heartscale
- least Bell's vireo
- longfin smelt
- palmate-bracted salty bird's-beak
- round-leaved filaree
- saline clover
- song sparrow ("Modesto" population)
- tricolored blackbird
- watershield
- woolly rose-mallow
- Site Parcels
- 1-Mile and 5-Mile site radii

Figure D-2
Special Status Species Occurrences in the Vicinity of 845 Ryde Avenue, Stockton

C:\Users\AA GIS\Projects\Horizon\DRS\mxd\Figures\Figures NWIInventory.mxd PG 6/18/2014

N

0 0.125 0.25

Miles

Horizon WATER and ENVIRONMENT

NWI Wetlands and Waters Types

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Site Parcels

Source: U.S. Fish & Wildlife Service, 2010

Figure D-3

National Wetland Inventory Map for 845 Ryde Avenue, Stockton

C:\Users\AA GIS\Projects\Horizon\DRS\mxd\Figures\Figures FEMAFlood100 MHHWRise.mxd PG 6/18/2014

N

0 0.125 0.25

Miles

Horizon WATER and ENVIRONMENT

100-Year Flood Zone

Zone AE Base Flood Elevations determined.
Zone AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

Site Parcels

Existing Area at or below MHHW

Potential Additional Area at or below MHHW with 55" Sea Level Rise

Flood zone source: FEMA, 2009; 2012; 2013; 2014
Tidal depths source: URS, 2008

Figure D-4

Flood and Sea Level Rise Risk Analysis for 845 Ryde Avenue, Stockton

APPENDIX E

Screening Results

2151 Wilbur Avenue, Antioch

2151 WILBUR AVENUE, ANTIOCH

Summary of Findings

The 2151 Wilbur Avenue site is comprised of 5 parcels totaling 18.15 acres located near the City of Antioch. Figure E-1 provides representative photographs of the site. The screening scores for site are shown in Table E-1. Overall, this site received a weighted score of 64.5. Explanations for these scores are described by criterion below.

Table E-1. Level 3 Screening Results – 2151 Wilbur Avenue, Antioch

Criterion	Score	Weighting (%)	Weighted Score
1. Compatibility with existing/planned uses for adjacent land	100	0.05	5
2. Access to utilities, including power, sewer, and telecommunications	100	0.05	5
3. Suitability for development of a marina	95	0.15	14.25
4. Centrally Located within IEP Monitoring Region	100	0.15	15
5. Biological resources constraints	1	0.05	0.05
6. Cultural resources constraints	50	0.05	2.5
7. On-site environmental contamination	1	0.10	0.1
8. Suitability of water supply for facility operations	50	0.15	7.5
9. Vulnerability to flooding and sea level rise	100	0.15	15
10. Proximity to Potential Hatchery Site	1	0.10	0.10
		TOTAL	**64.5**

Supporting Information

1. Compatibility with Existing/Planned Uses for Adjacent Land

The 2151 Wilbur Ave site is located in unincorporated Contra Costa County. However, the site is within an area that the City of Antioch has identified for potential future annexation (City of Antioch 2003). Based on a May 2014 site visit, existing land use involves recycling activities.

The land within the 2151 Wilbur Ave site is designated as Heavy Industry and Open Space in Contra Costa County's General Plan (Contra Costa County2005). The Heavy Industry designation allows for activities requiring large areas of land with convenient truck and rail access (Contra Costa County 2005). Appropriate uses in the Heavy Industry designation may include metalworking, chemical or petroleum product processing and refining, heavy equipment operation and similar activities. The Open Space designation allows for uses such as resource management (e.g., maintaining critical marsh and other endangered habitats) and low-intensity, private recreation (Contra Costa County 2005).

Land adjacent to the site on the east is also designated as Heavy Industry and Open Space, while land to the west is designated as Parks and Recreation and Open Space. This area is part of the Antioch Dunes National Wildlife Refuge. Land adjacent to the site on the south (across the road) is designated as Single Family Residential-Medium Density, Business Park, Open Space, and Public/Semi-Public (Contra Costa County 2005).

Although the 2151 Wilbur Ave site is currently within the jurisdiction of Contra Costa County, it is included in the City of Antioch's General Plan, as part of the Eastern Waterfront Employment Focus Area (City of Antioch 2003). The Eastern Waterfront Employment Focus Area is intended to plan for the revitalization of former heavy industrial lands along the river, as well as to provide employment opportunities for the people of Antioch (City of Antioch 2003). Within the Eastern Waterfront Employment Focus Area, the land containing the Wilbur Ave site is designated as General Industrial. The General Industrial designation allows for a range of industrial businesses, including primary processing facilities and industrial uses that may require large structures outside of buildings, such as cranes or conveyor systems (City of Antioch 2003). Land adjacent to the site on the east is also designated as General Industrial, while land to the west is designated as Open Space and land to the south is designated as Rail-Served Industrial (City of Antioch 2003). The Project is compatible with these neighboring designations.

Because the FTC/ERS would be compatible with surrounding land uses, this site received a score of **100** for this criterion.

2. Access to Utilities, including Power, Water, Sewer and Telecommunications

Detailed information on the availability of utilities at the site was not available at the time this report was prepared. Several commercial businesses exist along Wilbur Avenue in the vicinity of the site. It is therefore assumed that basic utilities (electric, water, sewer) are available at the site boundaries along Wilbur Avenue.

Broadband connections of varying speeds are available via AT&T and MegaPath (CPUC 2013). The site receives full voice coverage and receives full data coverage for: Verizon 4G LTE, AT&T 4G LTE, Sprint 4G LTE, T-Mobile 4G LTE (all according to each service provider's coverage map).

Because this site appears to have access to the utilities described above, it received a score of **100** for this criterion.

3. Suitability for Development of a Marina

This site was scored as follows for the sub-criteria used to identify the overall suitability for development of a marina.

Table E-2. Suitability for Marina Development at 2151 Wilbur Ave, Antioch				
Criterion No.	**Description**	**in-Channel Score**	**Off-Channel Score**	**Rationale for Score**
1a	Waterfront Area Suitability	1	100	Ample amount of waterfront area provides for flexibility in boat launch and marina basin and entrance configurations of an off-channel marina while an in-channel marina is restricted by nearshore depths and channel width.
1b	Backland Support Area Suitability	100	100	Large amount of backland area provides for flexibility in layout of boat storage and other uses.
2	Water Level Variation	100	100	Water level variation at the site does not present any significant challenge to marina design, access to the docks, boat launch ramp design or utilizing the wharf/pier.
3	Accessible Depths	100	100	Depths in excess of those required for the design vessels exist.
4	Site Grading/Excavation Requirements	100	50	Off-channel marina will require some excavation.
5	Impact of Commercial Traffic	50	100	Commercial traffic associated with nearby facilities create a moderate likelihood that an in-channel marina will be impacted by vessel wake while an off-channel marina has a low likelihood of being impacted.
6	Sedimentation Potential	100	100	There is a low likelihood that high sedimentation is an issue in the area.
7	Waterborne Debris Potential	100	100	In-channel or off-channel marina has a low likelihood to be impacted by waterborne debris.
8	Flood Hazard Area	100	100	Site is above flood elevations.
9	Marine Services Availability	100	100	High likelihood of marine services being easily provided to the site.
Average		**85**	**95**	

The score for the off-channel marina (**95**) is used in the ranking because it is assumed that this type of marina could be developed.

4. Centrally Located within IEP Monitoring Region

This site is centrally located within the IEP monitoring region (See Figure 6). Therefore, this site received a score of **100** for this criterion.

5. Biological Resources Constraints

Overview

The site is entirely within an area that historically supported sand dune habitat. The site currently includes a mosaic of habitats including developed/disturbed areas, degraded dune habitat, brackish marsh, and riparian areas. The developed/disturbed areas include small buildings, storage facilities, paved and unpaved roads. Vegetation in the developed areas is primarily non-native species such as ripgut brome (*Bromus diandrus*), wild oats (*Avena fatua*), yellow star-thistle (Centaurea solstitialis), pampas grass (*Cortaderia jubata*) and tree tobacco (*Nicotiana glauca*).

The western portion of the site is predominately degraded dune habitat. The topography and historic maps suggest that sand mining occurred in this area. The dune habitat has also been degraded by encroachment of vegetation. This portion of the site lies adjacent to the Sardis Unit of the Antioch Dunes National Wildlife Refuge.

Brackish marsh and riparian vegetation exist along the San Joaquin River's banks and in small isolated pockets near the shoreline. These areas support herbaceous vegetation such as common reed (*Phragmites australis*), giant reed (*Arundo donax*), hardstem bulrush (*Schoenoplectus acutus*), and giant reed (*Arundo donax*), along with woody vegetation such and willow (*Salix* sp.), walnut (*Juglans* sp.) and coast live oak (*Quercus agrifolia*). There is also a large California sycamore (*Platanus racemosa*) tree along the shoreline.

Special-Status Species

Figures E-2a and E-2b provide maps of species known to occur in the vicinity of the site. Table E-3 lists special-status species that are known or expected to occur at the site.

Table E-3. Special-status species known or expected to occur at the Wilbur Avenue site.

Species	Status	Habitat/Location	Data Sources	Comments
Plants				
Antioch Dunes evening-primrose (*Oenothera deltoides ssp. Howellii*)	Federal and State Endangered	Dunes	CNDDB 2014	Occurrences reported in the CNDDB on western parcels and suitable habitat is present. Nearly the entire site is within designated critical habitat for the species.
Contra Costa wallflower (*Erysimum capitatum var. angustatum*)	Federal and State Endangered	Dunes	CNDDB 2014	Occurrences reported in the CNDDB on western parcels and suitable habitat is present. Nearly the entire site is within designated critical habitat for the species.
Suisun marsh aster (*Aster lentus*)	Rare Plant Rank 1B.2	brackish marsh	CNDDB 2014	Species is reported in adjacent areas in the CNDDB. Suitable habitat is present.
Delta mugwort (*Limosella subulata*)	Rare Plant Rank 2.1	Brackish marsh	CNDDB 2014	Species is reported in adjacent areas in the CNDDB. Suitable habitat is present.
Mason's lilaeopsis (*Lilaeopsis masonii*)	Rare Plant Rank 1B.1, State Species of Concern	Brackish marsh	CNDDB 2014	Species is reported in adjacent areas in the CNDDB. Species was not observed during a May 2014 site visit, but this does not confirm absence.
Invertebrates				
Lange's metalmark butterfly (*Apodemia mormo langei*)	Federal Endangered	Dunes	NMFS and CDFW range maps, CNDDB 2014	Occurrences reported in the CNDDB and suitable habitat is present.

Species	Status	Habitat/Location	Data Sources	Comments
Fish				
steelhead – Central Valley DPS (*Oncorhynchus mykiss)*	Federal Threatened	River/brackish marsh	CNDDB 2014	Species is present in this portion of the Delta during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
winter-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Endangered	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Delta during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
spring-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Threatened	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Detla during seasonal migration periods.
fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*)	Species of Concern	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Delta during seasonal migration periods. Area is generally unsuitable for juvenile rearing.
green sturgeon (*Acipenser medirostris*)	Federal Threatened	River	NMFS range maps	Species may be present in this portion of the Delta year-round. Spawning occurs further upstream.
Delta smelt *Hypomesus transpacificus*	Federal and State Threatened	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Delta year-round.
longfin smelt (*Spirinchus thaleichthys*)	State Threatened	River/brackish marsh	USFWS and CDFW range maps, CNDDB 2014	Species may be present in this portion of the Delta year-round.
Sacramento splittail (*Pogonichthys macrolepidotus*)	State Species of Concern	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Delta year-round.
Pacific lamprey (*Lampetra tridentate*)	USFWS Species of Concern	River	USFWS range map	Species is present in this portion of the Delta during seasonal migration periods.
river lamprey (*Lampetra ayresii*)	State Species of Concern	River	CDFW range map	Species may be present in this portion of the Delta year-round.
Reptiles				
Silvery Legless Lizard (*Anniella pulchra pulchra*)	State Species of Concern	Dunes/uplands	CNDDB 2014	Species occurs in close proximity to the site. Undeveloped upland areas provide suitable habitat.
Birds				
Swainson's hawk (*Buteo swainsoni*)	State Threatened	Riparian/upland	CNDDB 2014	Species occurs in close proximity to the site. Site provides marginally suitable nesting foraging habitat.
saltmarsh common yellowthroat (*Geothlypis trichas sinuosa*)	State Species of Concern	Brackish marsh/riparian	CNDDB 2014	Species occurs in close proximity to the site. Shoreline area provides suitable nesting and foraging habitat.

Species	Status	Habitat/Location	Data Sources	Comments
song sparrow (*Melospiza melodia*) ("Modesto" population)	State Species of Concern	Brackish marsh/riparian	CNDDB 2014	Species occurs in close proximity to the site. Shoreline area provides suitable nesting and foraging habitat.

Wetlands and Waters of the U.S.

Figure E-3 provides a map of wetlands and waters from the NWI (USFWS 2010). The NWI map shows the San Joaquin River as "Estuarine and Marine Deepwater". This portion of the river is considered Traditionally Navigable Waters under the CWA. Brackish marsh along the banks of the river is mapped by NWI as "Estuarine and Marine Wetland." These areas would be considered jurisdictional wetlands under the CWA. Some small pockets of riparian vegetation in the northern portion of the site that are not mapped by NWI may also support wetlands.

Summary of Constraints and Ranking

Upland areas in the site that have been previously developed are not likely to support special-status species. Trees and other woody vegetation in developed areas may provide suitable nesting habitat for raptors and migratory passerines. Impacts to nesting birds could be avoided or minimized by limiting construction to seasonal work periods, establishing buffers, or removing nesting habitat outside of the nesting season.

Development in degraded dune habitat would be constrained because these areas have the potential to support federally endangered species that are associated with the Antioch Dunes, including the Antioch Dunes evening-primrose (*Oenothera deltoides ssp. Howellii*), Contra Costa wallflower (*Erysimum capitatum* var. *angustatum*), and Lange's metalmark butterfly (*Apodemia mormo langei*). Furthermore, nearly the entire site is designated as critical habitat for Antioch Dunes evening-primrose and Contra Costa wallflower (Figure E-2a).

Several special-status plants species have been identified in brackish marsh habitat on the shoreline of the site or in adjacent areas (Figure E-2a). These species include Mason's lilaeopsis (*Lilaeopsis masonii*), Delta mudwort (*Limosella subulata*), and Suisun marsh aster (*Aster lentus*). Surveys for these species have not been conducted this screening analysis, but suitable habitat is present and it is reasonable to assume that they may occur on the site.

The San Joaquin River and adjacent brackish marsh habitat support several special-status fish species that are associated with the Delta ecosystem. Impacts to fish could be minimized by limiting construction work periods to avoid seasonal migrations and spawning periods for most species.

In summary, ERS/FTC development in previously disturbed areas is not likely to impact special-status species or wetlands. However, substantial portions of the site have the potential to support several federally-listed endangered species associated with dune habitat. Development along the shoreline and adjacent areas has the potential to impact sensitive habitats, wetlands, and a special-status plant species. This site received a score of **1**, primarily because development in large portions of the site would be constrained by designated critical habitat and the potential presence of endangered species.

6. Cultural Resources Constraints

This collection of parcels is on the south bank of the San Joaquin River directly south of West Island. The Antioch North 1918 USGS 7.5" topographic map shows structures of unknown purpose on the property. Sand mining appears to be the primary purpose for this property in the historic-era, as the 1953 USGS topographic map indicates sand pits on the property. A 1939 aerial photograph shows a dock on the north end of the property, though the riverbank has moved north over time and now covers the location of the dock. One historic-era archaeological resource exists within 0.25 miles of the location:

CA-CCO-718/H — The Atchison, Topeka, and Sante Fe railroad travels 0.1 miles south of the property.

A short branch off of the railroad appears in the 1953 topographic map and may be associated with the sand mining activities at the site. The portion of the branch line within the property area is in disuse and has been partially paved over on Wilbur Avenue.

The site is within ethnographic Bay Miwok territory. The delta provided estuarine resources such as fish, tule reed, and waterfowl. The main village of the Chupcan people is known to have existed within modern-day Antioch, California, within several miles of the Wilbur Avenue site. There is a potential for sub-surface prehistoric resources (Bennyhoff 1977).

One cultural study, with negative results, has been conducted within the site area:

S-34412 — Archaeological Reconnaissance of the Pacific Gas and Electric Company 230 kV Delta Transmission Line Reconductoring Project, Solano, Sacramento, and Contra Costa Counties, California.

Historic-era mining and railroad rails indicate the possibility of sub-surface historic-era material, though the site has been compromised by the development of several ponds and a parking lot in the modern-era. The railroad rails would need to be further assessed to determine if they are recorded as a portion of the Atchison, Topeka, and Santa Fe railroad. Additionally, the site is near a Bay Miwok village and may contain sub-surface prehistoric resources. For these reasons, this site received a score of **50**.

7. On-site Environmental Contamination

According to the EDR Database Report, the subject property was not identified in the EDR database search. However, one facility (Kemwater North America Company) listed on the database report is interpreted to be located on the subject property and is discussed below.

- Kemwater North America Company, 2151 Wilbur Ave (located southeast, up-to cross gradient, and 0.006 mile from the subject property) – The site is interpreted to be located on the subject property and is listed on the CA WMUDS/SWAT, CA Cortese, SLIC, CONTRA COSTA CO SITE LIST, CHMIRS, ENF, SSTS and WDS databases. The site is listed on the WMUD/SWAT database for operating an industrial waste facility that treats and/or disposes of liquid or semisolid wastes from mining or gravel washes or other industrial sources. The listing indicates that the site is enrolled in the Toxic Pits Cleanup Act and the threat to water quality is listed as moderate. No violations were noted. The site is listed on the SLIC site as open-remediation for a release of heavy metals, volatile organic compounds (VOCs), and other chemicals. According to Geotracker, four former impoundments (the Truck Washwater Pond, Sands Pits A and B, Pond A, and North Berm) have been identified as areas of concern at the subject property. Plumes of copper and ammonia intersect the San Joaquin River. A draft Feasibility Study, submitted in 2006, recommends No Action for Soil or Groundwater as a Risk Assessment Study and indicated that the contamination does not pose an unacceptable risk to human health or the environment. Based on the current status of this site, this site poses a negative environmental concern for the subject property and is considered a REC.

Several adjoining sites were identified on databases indicating these sites contained USTs and surrounding sites were identified on databases indicating releases, including Gaylord Container Antioch Mill, GWF Power Systems LP, Imperial West Chemical Co, and PG&E.

Based on a review of historical aerial photographs (1939, 1949, 1959, 1968, 1974, 1981, 1998, 2005, 2006, 2009, 2010, and 2012) and topographic maps (1908, 1918, 1953 [2], 1968, and 1978), the site appeared to had been used for sand mining as indicated on the 1939 and 1949 aerial photographs and the 1953 through 1968 topographic maps (depicting sand pits on site and on surrounding properties). By the 1970s, the site was used for industrial purposes and contained one large pond along Wilbur Avenue and several smaller ponds. These ponds were first observed on the 1974 aerial photograph and 1978 topographic map but appeared to be removed by the late 1990s, as they were not observed on the 1998 aerial photograph. Based on unknown construction details of the ponds, their contents, and lack of details regarding their closure, these ponds are considered a REC in connection to the subject property.

Groundwater is expected to follow topography and flow north towards the Sacramento–San Joaquin River Delta. Therefore, sites located south of the subject property likely are to be upgradient to the subject property. Historical and current land uses in the vicinity of the subject property appear to be industrial. Surrounding sites to the east and south contained multiple oil tanks from 1950 to at least 2005 and a sewage disposal facility to the west of the subject property from approximately 1953 to approximately 1978. The 1978 topographic map depicts a substation west of the subject property.

Based on the current status of this site, this site poses a negative environmental concern for the subject property and is considered a REC. Therefore, this site received a score of **1**.

8. Suitability of Water Supply for Facility Operations

The site is in the San Joaquin Valley Groundwater Basin (Tracy Subbasin). The Tracy Subbasin is bounded by the Diablo Range on the west; the Mokelumne and San Joaquin Rivers on the north; the San Joaquin River to the east; and the San Joaquin-Stanislaus County line on the south. DWR lists the Basin as groundwater basin number 5-22.15.

According to DWR (2006) groundwater in the northern part of the subbasin is characterized by a sodium water type, as well as a wide range of anionic water types including: bicarbonate, chloride, and mixed bicarbonate-chloride types. Total Dissolved Solids (TDS) concentrations in well water sampled in San Joaquin and Contra Costa Counties ranged from 50 to 3,520 mg/L, with a mean of 463, based on information from 1981. The highest TDS values were found in the central and western portion of the USGS study area (TDS range from 210 to 7,800 mg/L, with an average of about 1,190 mg/L.

Areas of poor water quality exist throughout the subbasin. Areas of elevated chloride occur along the western side of the subbasin and along the San Joaquin River (among other areas). Areas of elevated nitrate occur in the northwestern part of the subbasin.

In addition, as described under Criterion 7, the site itself, and adjacent properties, are listed in the state's Geotracker database for groundwater contamination. Contaminants include organics, inorganics, and heavy metals. While groundwater wells for the FTC would likely be deeper than the relatively shallow contamination, this contamination could still impair water quality at the site for use at the FTC. Monitoring of shallow groundwater at the site has shown salinity levels within acceptable ranges but pH values that are lower than acceptable thresholds.

Except for seasonal variation resulting from recharge and pumping, the majority of water levels in the basin have remained relatively stable. Due to the proximity to the San Joaquin River, recharge should be excellent. Well yields range from 500–3,000 gpm in the Tulare Formation.

Parameter	**Determination**
Flow/Quantity	Groundwater wells should be able to produce sufficient yields, and groundwater storage and recharge potential appears to be adequate.
Salinity	Salinity levels have potential to be problematic but are likely to be within acceptable ranges.
Other factors	Site contamination may impair the ability to use groundwater from the site

Because the potential for contamination to affect groundwater quality at this site, it received a score of **50** for this criterion.

9. Vulnerability to Flooding and Sea Level Rise

Figure E-4 shows the FEMA Special Flood Hazard Area (i.e., 100-year flood zone) and MHHW +55-inch SLR scenario. The figure shows that the shoreline area is within the 100-year flood zone. Likewise, shoreline area would be subject to inundation under the MHHW +55-inch SLR scenario (Figure E-4). There are some small pockets within the site that appear to be subject to inundation by SLR. Based on site reconnaissance, it is believed that these areas are old pits that would likely be filled if the site is developed. There is sufficient area to develop ERS/FTC facilities outside of the 100-year flood zone and areas that are vulnerable to SLR. Therefore, this site received a score of **100**.

10. Proximity to a Potential Hatchery Site

This site cannot accommodate the proposed USFWS Hatchery. In addition, this site is not within 10 miles of a known available site that could accommodate the Hatchery. Therefore, this site received a score of **1** for this criterion.

References

Bennyhoff, James A., 1977. *Ethnogeography of the Plains Miwok.* Center for Archaeological Research at Davis, Publication Number 5, Davis, California.

California Department of Water Resources (DWR). 2006. California's Groundwater, Bulletin 118. http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm. Accessed: June 18, 2014

California Department of Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service (DWR et al.). 2013. Draft Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan. November. (ICF 00674.12.) Prepared by ICF International, Sacramento, CA.

California Natural Diversity Data Base (CNDDB). 2014. California Department of Fish and Wildlife, Biogeographic Data Branch. Sacramento, California. June 2014 update

California Public Utilities Commission (CPUC). 2013. California Broadband Availability. Available at: http://www.broadbandmap.ca.gov/map/. Accessed on March 12, 2014

City of Antioch. 2003. General Plan. Available: http://www.ci.antioch.ca.us/citygov/commdev/planningdivision/docs/Antioch_Adopted_General_Plan.pdf.

Contra Costa County. 2005. General Plan: Land Use Element. Available: http://contra.napanet.net/depart/cd/current/advance/GeneralPlan/LandUseMap.pdf. Accessed March 14, 2014.

Contra Costa County. 2014. CCMAP - Contra Costa County GIS Mapping System. Available: http://gismap.ccmap.us/imf/imf.jsp?site=ccmap&qlyr=Parcel&qbuf=100&qhlt=true&qzoom=true&qsel=true&qry=APN%3D%27051020011%27. Accessed March 14, 2014.

U.S. Fish and Wildlife Service (USFWS). 2010. National Wetlands Inventory database. Retrieved online on June 2014 at: http://www.fws.gov/wetlands

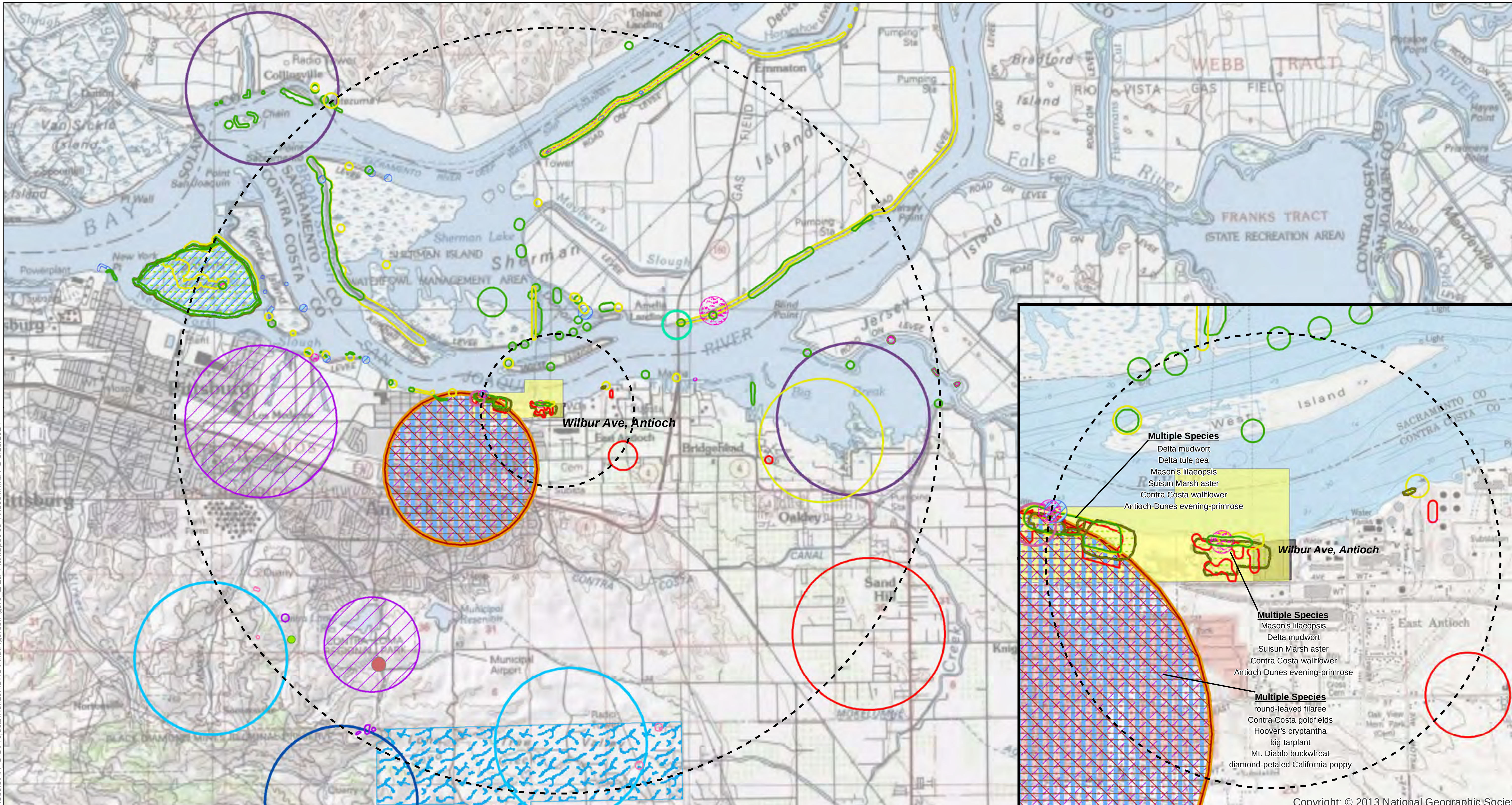
Figure E-1. Photographs of 2151 Wilbur Avenue, Antioch

Photo No. 1	Date: 5/28/2014
Description: Typical conditions in developed portions of the site	

Photo No. 2	Date: 5/28/2014
Description: Typical conditions in developed/disturbed portions of the site	

Photo No. 3	Date: 5/28/2014
Description: Typical conditions along the shoreline (looking east)	

Photo No. 4	Date: 5/28/2014
Description: Dune habitat/sand pit in southwestern portion of site	



C:\Users\AA_GIS\Projects\Horizon\DRS\mxd\Figures\Figure_E-2a_PlantSpecies_Antioch.mxd PG 6/18/2014

N

0 1 2

Miles

Horizon WATER and ENVIRONMENT

- Antioch Dunes buckwheat
- Antioch Dunes evening-primrose
- Bolander's water-hemlock
- Brewer's western flax
- Contra Costa goldfields
- Contra Costa wallflower
- Delta mudwort
- Delta tule pea
- Hoover's cryptantha
- Mason's lilaeopsis
- Mt. Diablo buckwheat
- Mt. Diablo manzanita
- Suisun Marsh aster
- big tarplant
- diamond-petaled California poppy
- large-flowered fiddleneck
- round-leaved filaree
- shining navarretia
- showy golden madia
- soft salty bird's-beak

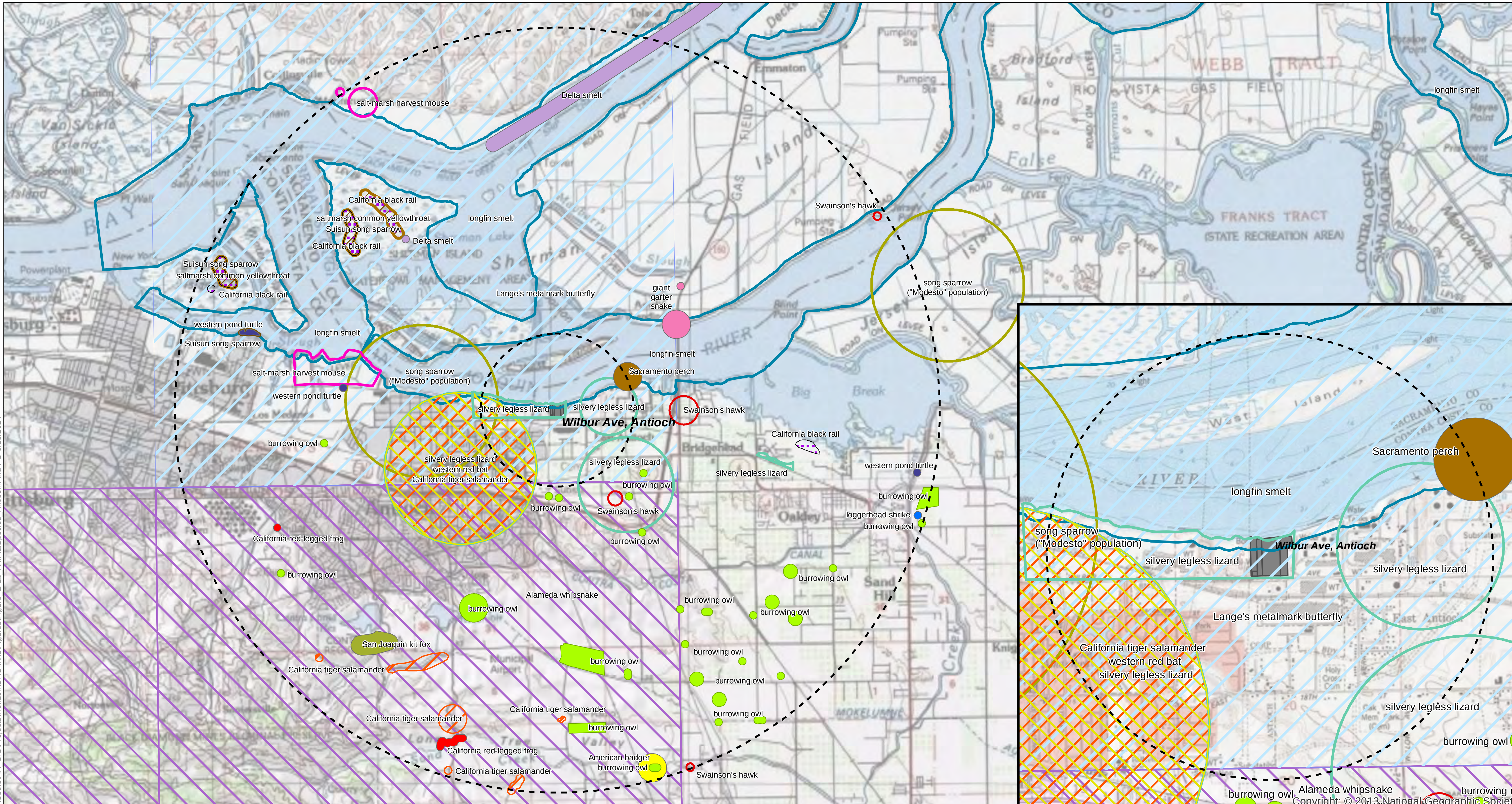
Critical Habitat

- Contra Costa wallflower and Antioch dunes evening primrose
- Site Parcels
- 1-Mile and 5-Mile site radii

Source: California Natural Diversity Database, California Dept. of Fish & Wildlife, June 2014

Figure E-2a

Special Status Plant Species Occurrences in the Vicinity of 2151 Wilbur Avenue, Antioch



N

0 1 2

Miles

Horizon WATER AND ENVIRONMENT

- Alameda whipsnake
- American badger
- California black rail
- California red-legged frog
- California tiger salamander
- Delta smelt
- Sacramento perch
- San Joaquin kit fox
- Suisun song sparrow
- Swainson's hawk
- burrowing owl
- giant garter snake
- loggerhead shrike
- longfin smelt
- salt-marsh harvest mouse
- Lange's metalmark butterfly
- saltmarsh common yellowthroat
- silvery legless lizard
- song sparrow ("Modesto" population)
- western pond turtle
- western red bat
- Site Parcels
- 1-Mile and 5-Mile site radii

Source: California Natural Diversity Database, California Dept. of Fish & Wildlife, June 2014

Figure E-2b

Special Status Animal Species Occurrences in the Vicinity of 2151 Wilbur Avenue, Antioch

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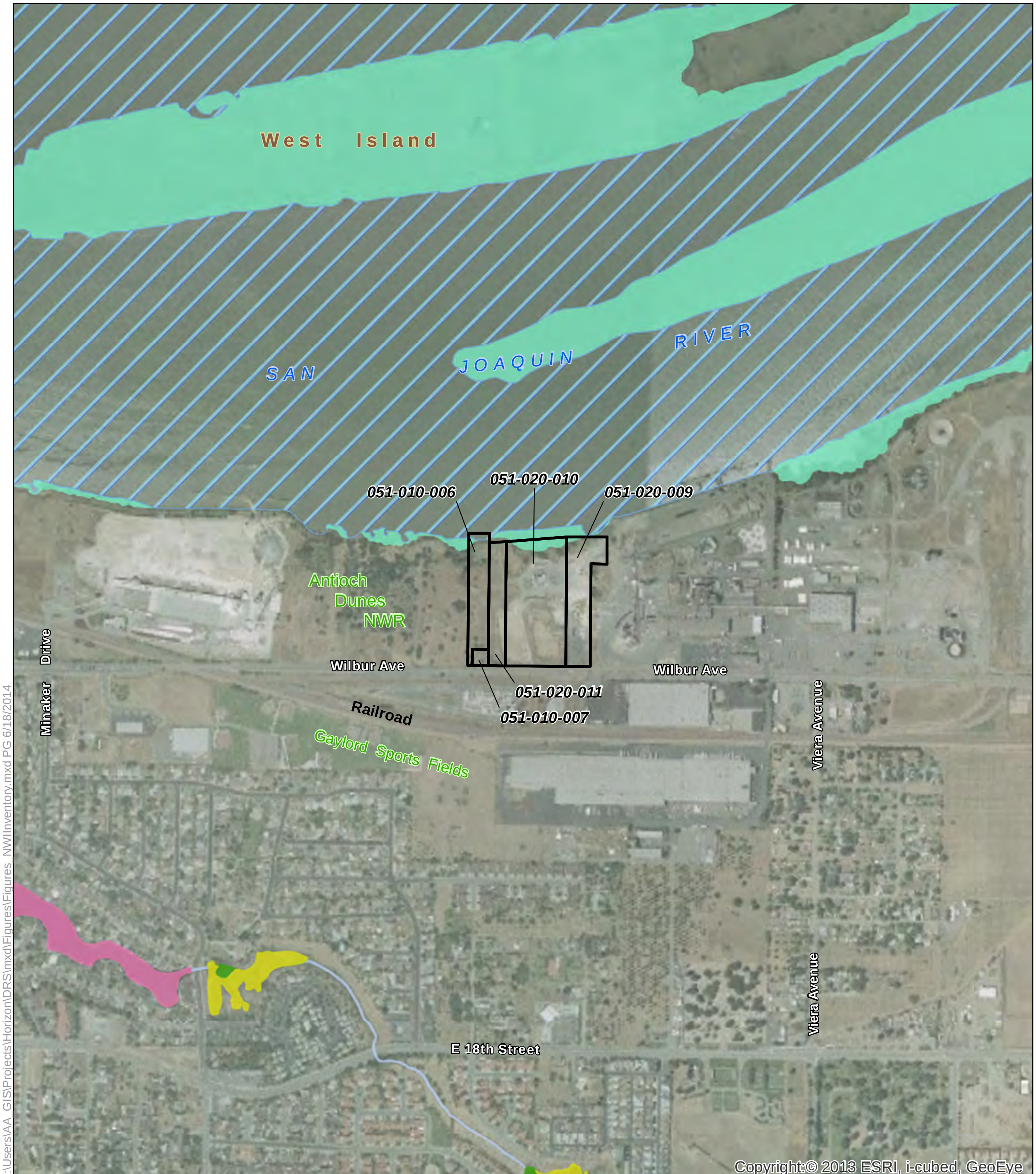


C:\Users\AA GIS\Projects\Horizon\DRS\mxd\Figures NWIInventory.mxd PG 6/18/2014

N

0 0.125 0.25

Miles

Horizon WATER and ENVIRONMENT

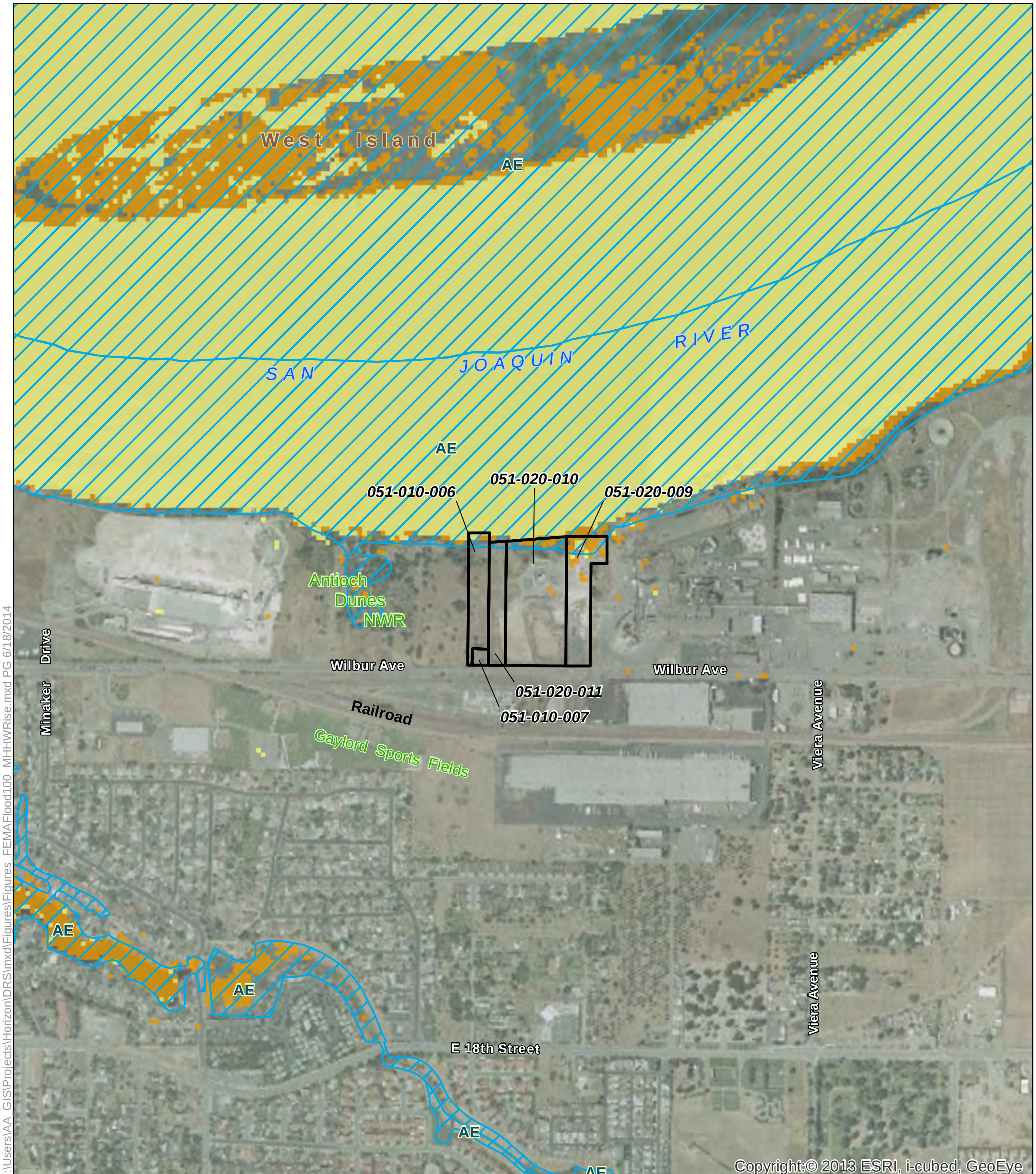
NWI Wetlands and Waters Types

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Site Parcels

Source: U.S. Fish & Wildlife Service, 2010

Figure E-3

National Wetland Inventory Map for 2151 Wilbur Avenue, Antioch



C:\Users\AA_GIS\Projects\Horizon\DRS\mxd\Figures\Figures_FEMAFlood100_MHHWRise.mxd PG 6/18/2014

N

0 0.125 0.25
Miles

Horizon WATER and ENVIRONMENT

100-Year Flood Zone

Zone AE Base Flood Elevations determined.
Zone AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

Site Parcels

Existing Area at or below MHHW

Potential Additional Area at or below MHHW with 55" Sea Level Rise

Flood zone source: FEMA, 2009; 2012; 2013; 2014
Tidal depths source: URS, 2008

Figure E-4

Flood and Sea Level Rise Risk Analysis for 2151 Wilbur Avenue, Antioch

APPENDIX F

Screening Results

South River Road, West Sacramento

South River Road, West Sacramento

Summary of Findings

The South River Road site is 42.24-acre parcel located within the City of West Sacramento. Figure F-1 provides representative photographs of the site. The screening scores for the South River Road site are shown in Table F-1. Overall, this site received a weighted score of 29. Explanations for these scores are described by criterion below.

Table F-1. Level 3 Screening Results – South River Road, West Sacramento

Criterion	Score	Weighting (%)	Weighted Score
1. Compatibility with existing/planned uses for adjacent land	1	0.05	0.05
2. Access to utilities, including power, sewer, and telecommunications	50	0.05	2.5
3. Suitability for development of a marina	40.5	0.15	6
4. Centrally Located within IEP Monitoring Region	1	0.15	0.15
5. Biological resources constraints	1	0.05	0.05
6. Cultural resources constraints	50	0.05	2.5
7. On-site environmental contamination	100	0.10	10
8. Suitability of water supply for facility operations	50	0.15	7.5
9. Vulnerability to flooding and sea level rise	1	0.15	0.15
10. Proximity to Potential Hatchery Site	1	0.10	0.10
		TOTAL	**29**

Supporting Information

1. Compatibility with Existing/Planned Uses for Adjacent Land

Existing land use on the site is agriculture, primarily for fodder or cereal crops. According to the City of West Sacramento's General Plan, existing land uses around the site include agriculture/open space, vacant, single-family residential and public/quasi-public (City of West Sacramento 2009a).

In the City of West Sacramento's General Plan, the land within the South River Road site is designated as Low Density Residential and Medium Density Residential (City of West Sacramento 2009b). These designations provide for single-family detached and attached homes, secondary residential units, public and quasi-public uses, and similar and compatible uses.

Land adjacent to the site on the south (i.e., shoreline of the Sacramento River) is designated as Recreation & Parks and Open Space. Land adjacent to the site on the east and west appears to be designated as Residential, while land to the north is designated as Open Space and High Density Residential (City of West Sacramento 2009b).

The zoning for the South River Road site is primarily Residential – One Family (R1-B) and Residential (R-2), with portions of the site possibly zoned as Public Quasi Public (PQP) and Recreation – Parks (RP) (City of West Sacramento 2009c). Allowable land uses in Residential zoning districts include single and multiple-family homes (City of West Sacramento 2009a). Allowable land uses in Public Quasi Public District include government-owned facilities, schools and hospitals, and roads (City of West Sacramento 2009a). Typical uses permitted in the Recreation – Parks District include existing and planned public parks (City of West Sacramento 2009a).

Land adjacent to the site on the south is zoned RP and Open Space. Adjacent land to the east and west of the site is zoned as R1-B and R-2, and adjacent land to the north is zoned as R-3 and Public Open Space (City of West Sacramento 2009c).

The Southport Sacramento River Early Implementation Project (SSREIP) is being proposed by the U.S. Army Corps of Engineers and the West Sacramento Area Flood Control Agency along a portion of the Sacramento River, including along the Sacramento River adjacent to the site (ICF 2013). The levee along the north bank of the Sacramento River is proposed to be setback from its current location, thus encroaching on the southern portion of the site. Included in the SSREIP are floodplain restoration activities along the southern portion of the site. Development of a marina for the ERS/FTC would be a major conflict with floodplain restoration proposed by the SSREIP. Because of the conflict with the proposed SSREIP, this site has received a score of **1** for this criterion.

2. Access to Utilities, including Power, Sewer and Telecommunications

Electric and natural gas service is provided to West Sacramento customers by PG&E. PG&E currently operates a standard 12 kilovolt (kV) electrical distribution line supported by overhead wooden poles located along South River Road (ICF 2013). Domestic water supply for the property is provided by wells. The property does not have an existing connection to a sanitary sewer line; the closest main sewer line is approximately 1,700 ft to the southwest along Antioch Ave. Broadband connections of varying speeds are available via Frontier Communications and Digital Path (CPUC 2013). The location receives full voice coverage and receives full data coverage for: Verizon 4G LTE, AT&T 4G LTE, Sprint 3G, T-Mobile 4G LTE (all according to each service provider's coverage map).

This site received a score of **50** because connection to a sanitary sewer system is relatively far from the site boundary and there is no municipal domestic water supply available at the site.

3. Suitability for Development of a Marina

This site was scored as follows for the sub-criteria used to identify the overall suitability for development of a marina.

Table F-2. Suitability for Marina Development at South River Road, Western Sacramento			
Criterion No.	**Description**	**Off-Channel Score**	**Rationale for Score**
1a	Waterfront Area Suitability	1	Relatively small amount of waterfront area limits the flexibility in boat launch and marina basin and entrance configurations.
1b	Backland Support Area Suitability	50	Large amount of narrow backland area provides for some flexibility in layout of boat storage and other uses.
2	Water Level Variation	1	Large water level variation adds complexity in marina design, access to the docks, boat launch ramp design and utilizing the wharf/pier.
3	Accessible Depths	1	Accessible depths for the design vessels are met but only in narrow portions of the River around the project site
4	Site Grading/Excavation Requirements	1	Low site elevations create challenging design of marina, pier/wharf and boat launch ramp.
5	Impact of Commercial Traffic	100	Off channel marina has a low likelihood to be impacted by vessel wake generated by commercial traffic.
6	Sedimentation Potential	100	There is a low likelihood that high sedimentation is an issue in the area.
7	Waterborne Debris Potential	100	Off-channel marina has a low likelihood to be impacted by waterborne debris.
8	Flood Hazard Area	1	Levee protected site makes the construction and operation of the marina and boat launch complicated, particularly if a new levee is required around the off-channel marina basin.
9	Marine Services Availability	50	Moderate likelihood of marine services being easily provided to the site
Average		**40.5**	

4. Centrally Located within IEP Monitoring Region

This site is located along the northeastern periphery of the IEP monitoring region (See Figure 6). As such, it is not considered to be centrally located. Therefore, this site received a score of **1** for this criterion.

5. Biological Resources Constraints

Nearly the entire site is agricultural lands that are cultivated for fodder or cereal crops. In May 2014, the crop was ryegrass (Figure F-1). Agricultural ditches line the perimeter of the site. These ditches support riparian scrub habitat including species such as Himalayan blackberry (*Rubus armeniacus*), willow (*Salix* spp.), boxelder (*Acer negundo*), Fremont cottonwood (*Populus fremontii*), and oaks (*Quercus* spp.).

Special-Status Species

Figure F-2 provides a map of species known to occur in the vicinity of the site. Table F-3 lists special-status species that are known or expected to occur at the site.

Table F-3. Special-status species known or expected to occur at the South River Road site.				
Name	**Status**	**Habitat/Location**	**Data Sources**	**Comments**
Fish				
Steelhead – Central Valley DPS (*Oncorhynchus mykiss)*	Federal Threatened	River/brackish marsh	NMFS and CDFW range maps, CNDDB 2014	Species is present in this portion of the Sacramento River during seasonal migration periods.
Winter-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Endangered	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Sacramento River during seasonal migration periods
Spring-run Chinook salmon (*Oncorhynchus tshawytscha*)	Federal and State Threatened	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Sacramento River during seasonal migration periods.
Fall- and late fall-run Chinook salmon (*Oncorhynchus tshawytscha*)	Species of Concern	River/brackish marsh	NMFS and CDFW range maps	Species is present in this portion of the Sacramento River during seasonal migration periods. Juvenile rearing possible.
Green sturgeon (*Acipenser medirostris*)	Federal Threatened	River	NMFS range maps	Species may be present in this portion of the Sacramento River year-round.
Delta smelt *Hypomesus transpacificus*	Federal and State Threatened	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Sacramento River year-round.
Longfin smelt (*Spirinchus thaleichthys*)	State Threatened	River/brackish marsh	CDFW range maps, CNDDB 2014	Species may be present in this portion of the Sacramento River year-round.
Sacramento splittail (*Pogonichthys macrolepidotus*)	State Species of Concern	River/brackish marsh	USFWS and CDFW range maps	Species may be present in this portion of the Sacramento River year-round.
Pacific lamprey (*Lampetra tridentate*)	USFWS Species of Concern	River	USFWS range map	Adults present in this portion of the Sacramento River during seasonal migration periods. Early life stages may be present year-round.
river lamprey (*Lampetra ayresii*)	State Species of Concern	River	CDFW range map	Adults present in this portion of the Sacramento River during seasonal migration periods. Early life stages may be present year-round.
Reptiles				
giant garter snake (*Thamnophis gigas*)	Federal and State Threatened	Agricultural ditches and adjacent uplands	ICF 2013, CNDDB 2104	Agricultural ditches provide potentially suitable habitat.
Birds				
Tricolored blackbird (*Agelaius tricolor*)	State Species of Concern	Brackish marsh/riparian	CNDDB 2104	Species occurs in close proximity to the site, but is not expected to nest on site.
Swainson's hawk (*Buteo swainsoni*)	State Threatened	Riparian/upland	CNDDB 2014	Species occurs in close proximity to the site. Site provides high quality foraging habitat, but and possible nesting habitat.

Wetlands and Waters of the U.S.

Figure F-3 provides a map of wetlands and waters of the U.S. from the NWI (USFWS 2010). The NWI maps Sacramento River adjacent to the site as "Riverine" and it is considered Traditionally Navigable Waters under the CWA. Ditches along the perimeter of the site may support wetlands not mapped by NWI. At this time it is not known if wetlands within these ditches would be considered jurisdictional under the CWA.

Summary of Constraints and Ranking

Development at the site would mostly occur in upland, agricultural areas. These fields generally do not support special-status species, but they do provide important foraging areas for Swainson's Hawk (*Buteo swainsoni*). Loss of foraging habitat may require mitigation. Trees along the margins of the property provide suitable nesting habitat for raptors and migratory passerines. Impacts to nesting birds could be avoided or minimized by limiting construction to seasonal work periods, establishing buffers, or removing nesting habitat outside of the nesting season.

Agricultural ditches and adjacent uplands provide potentially suitable habitat for giant garter snake (*Thamnophis gigas*) (ICF 2013). Aquatic habitat along the periphery of the site could largely be avoided during site development. However, some impacts to adjacent upland habitat are likely unavoidable.

While the site does not currently have a direct connection to the Sacramento River, the Southport Sacramento River Early Implementation Project (SSREIP) is proposing a levee setback along this portion of the river. Development of the ERS/FTC marina would then occur in a restored floodplain area. The restored floodplain area would support aquatic and riparian habitats that have the potential to provide juvenile rearing of for fish such as Chinook salmon (ICF 2013). Development of a marina in this area would negate most of the benefits of the restored floodplain habitat.

In summary, ERS/FTC development would be focused in agricultural areas that provide foraging habitat for Swainson's Hawk and potential upland habitat for giant garter snake. The planned SSREIP would restore floodplain habitat in the southern portion of the site adjacent to the Sacramento River. Development of the marina in a floodplain area that has been restored in part for the benefit of native fish species would be a significant constraint. For these reasons, this site received a score of **1**.

6. Cultural Resources Constraints

This property has historically been used for farming. The Sacramento West 1916 USGS 7.5" topographic map indicates that a structure existed immediately south of the proposed project parcel and adjacent to the levee. One building can be identified in a 1957 aerial at the same location. This may be the same building that is currently standing at the same site. There are no previously recorded historic-era resources within 0.25 miles of the property.

This area is in the northern reaches of Plains Miwok ethnographic territory. There are no known prehistoric resources within 0.25 miles of the property, though prehistoric settlements are recorded all along the river. Riparian habitat along the Sacramento River provided the prehistoric population with an abundance of resources including wildlife such as salmon and tule elk and plant resources including acorns, a dietary staple (Bennyhoff 1977). Furthermore, a review of the USGS map indicates that the parcel is split by the 15-foot contour line with lower elevation land found to the west away from the river. This may be the remnant of the natural levee of the river formed by flood events and would be a likely location to find prehistoric resources similar to those found in West Sacramento below the plow zone.

Two cultural resource studies have been conducted along the levee and in the river; however no cultural resource study has been conducted on the property prior to this screening.

The main factor for sensitivity at this location is the building immediately south of the site. It is possible that remains of farming activities associated with the ranch are present on the project parcel. Though there are no known nearby prehistoric resources, there is always the possibility of unknown sub-surface deposits, especially with the site being adjacent to the river. For these reasons, this site received a score of **50.**

7. On-site Environmental Contamination

According to the EDR Database Report, the subject property was not identified in the EDR database search. One LUST site was identified in the databases as being located 0.558 mile south of the subject property (Shell). This site was identified as “completed – case closed.” Two sites were identified in the databases indicating releases. The closest of these two sites to the subject property is 0.531 mile south of the subject property (Riverside Shopping Center). One site was identified in the databases to be a potential historical dry cleaning site (Nowski Carpet and Upholstery Cleaning). This site is 0.487 mile south-southwest of the subject property.

Based on a review of historical aerial photographs (1937, 1947[2], 1957, 1964, 1971, 1981, 1993, 1998, 2005, 2006, 2009, 2010, and 2012) and topographic maps (1907, 1916, 1949, 1954, 1967, 1975, 1980, and 1992), the subject property appears to have been used for agriculture purposes. The subject property is in an agriculture area. These photographs show a structure believed to be a farmhouse on the southern portion of the subject property along South River Road. The remaining portion of the subject property appears to be agricultural fields. While there is potential to find environmental contaminants on the subject property due to agriculture activities, there are no known contaminants. For these reasons, this site received a score of **100.**

8. Suitability of Water Supply for Facility Operations

The location overlies the Yolo Subbasin, which is situated in the southern portion of the Sacramento Valley Basin, primarily within Yolo County. The California Department of Water Resources (DWR) lists the Yolo Subbasin as groundwater basin number 5-21.67.

According to DWR (2006), groundwater within the Yolo subbasin is characterized as a sodium magnesium, calcium magnesium, or magnesium bicarbonate type. TDS ranges from 107 mg/L to 1300 mg/L and averages 574 mg/L. Neither the site itself, nor adjacent properties, are listed in the state’s Geotracker database for active sites of groundwater contamination.

Well yields in older alluvium are reported to be up to 4,000 GPM adjacent to the Sacramento River, and similarly high in the Tehama Formation. Long-term monitoring of deep wells in the vicinity generally show stable groundwater levels with only small seasonal fluctuations. This is due in part to the relatively small amount of groundwater pumping in the area.

Parameter	Determination
Flow/Quantity	Groundwater wells should be able to produce sufficient yields, and groundwater storage and recharge potential should be adequate.
Salinity	Salinity levels should be within acceptable ranges.

Due to sufficient quantity, yields, and salinity, this site received a **100** for this criterion.

9. Vulnerability to Flooding and Sea Level Rise

Figure F-4 shows the FEMA Special Flood Hazard Area (i.e., 100-year flood zone) and MHHW +55-inch SLR scenario. The figure shows that the site is not within the 100-year flood zone. However, the data show that a substantial portion of the site would be subject to inundation under this SLR scenario (Figure F-4). While these methods do not account for routing of tidal flooding, potential levee improvements, or site grading, the data suggest that the site is vulnerable to SLR and development would be highly constrained (particularly when considering the proposed levee setback that is part of the SSREIP). Due to constraints associated with potential SLR, this site received a score of **1**.

10. Proximity to a Potential Hatchery Site

The site area with the planned SSREIP setback levee, this site would not accommodate both the ERS/FTC and Hatchery, nor has a suitable Hatchery site been identified within 10 miles. Therefore, this site received a score of **1** for this criterion.

References

Bennyhoff, James A., 1977. Ethnogeography of the Plains Miwok. Center for Archaeological Research at Davis, Publication Number 5, Davis, California.

California Department of Water Resources (DWR). 2006. California's Groundwater, Bulletin 118. http://www.water.ca.gov/groundwater/bulletin118/gwbasin_maps_descriptions.cfm. Accessed: June 18, 2014

California Department of Water Resources, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and National Marine Fisheries Service (DWR et al.). 2013. Draft Environmental Impact Report/Environmental Impact Statement for the Bay Delta Conservation Plan. November. (ICF 00674.12.) Prepared by ICF International, Sacramento, CA.

California Public Utilities Commission (CPUC). 2013. California Broadband Availability. Available at: http://www.broadbandmap.ca.gov/map/. Accessed on March 12, 2014

City of West Sacramento. 2009a. Public Review Draft General Plan Background Report, Chapter 2: Land Use. Available: http://www.cityofwestsacramento.org/generalplan2030/pdf/wsgpu_br_2landuse.pdf. Accessed March 14, 2014.

City of West Sacramento. 2009b. Land Use Map. Available: http://maps.cityofwestsacramento.org/resources/maps/COWS_LandUse_Map.pdf. Accessed March 14, 2014.

City of West Sacramento. 2009c. Zoning Map. Available: http://maps.cityofwestsacramento.org/resources/maps/COWS_Zoning_Map.pdf. Accessed March 14, 2014.

ICF International (ICF). 2013. Southport Sacramento River Early Implementation Project Environmental Impact Statement/Environmental Impact Report. Draft. Prepared for: U.S. Army Corps of Engineers, Sacramento, CA, and West Sacramento Area Flood Control Agency, West Sacramento, CA.   Available at: http://www.spk.usace.army.mil/Media/USACEProjectPublicNotices.aspx. Accessed May 17, 2014.

U.S. Fish and Wildlife Service (USFWS). 2010. National Wetlands Inventory database. Retrieved online on June 2014 at: http://www.fws.gov/wetlands

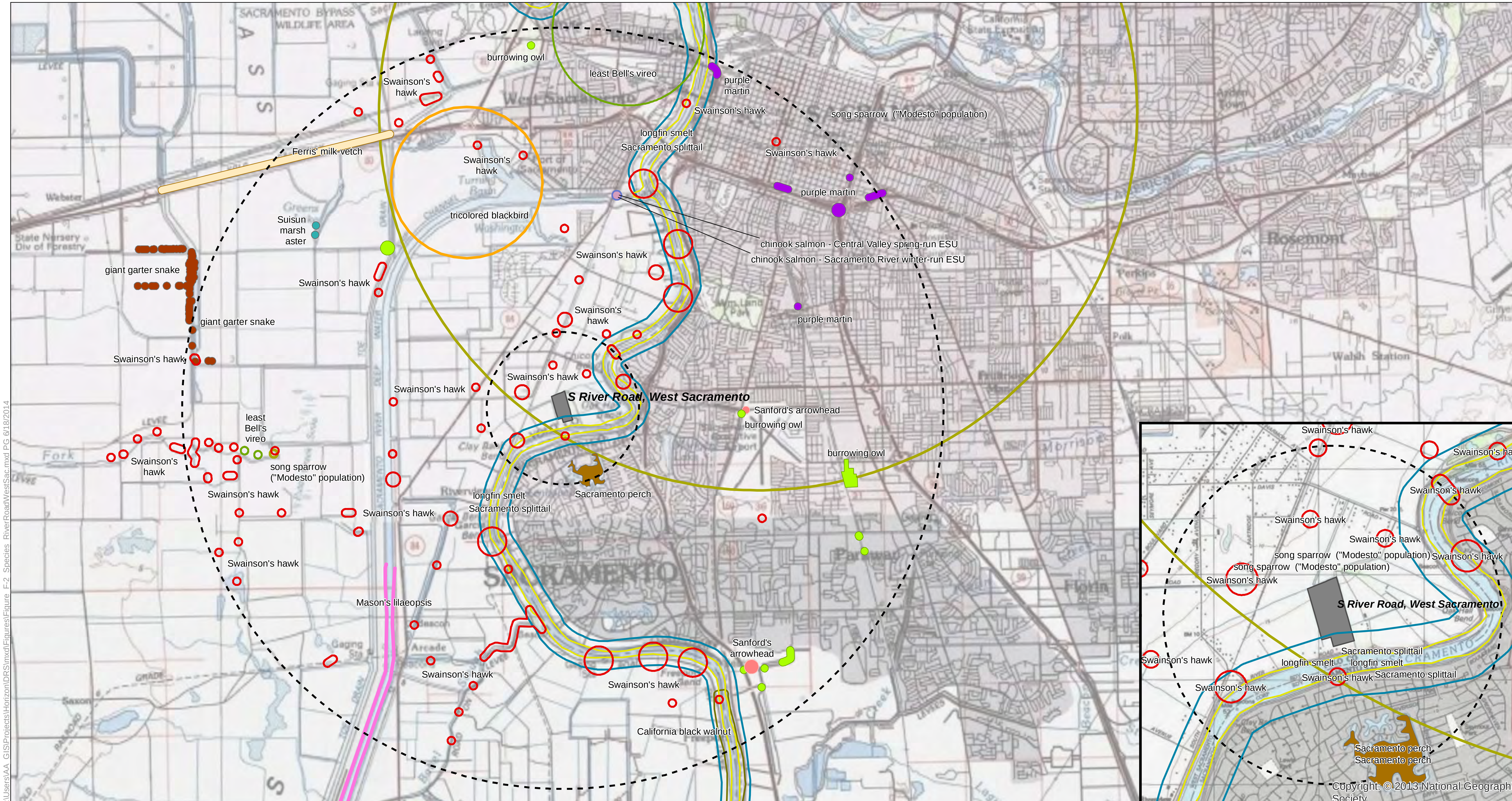
Figure F-1 South River Road property, West Sacramento

Photo No. 1	Date: 5/28/2014
Description: Typical conditions at the site. Note riparian vegetation along the perimeter of field.	

Photo No. 2	Date: 5/28/2014
Description: Typical conditions at the site. Note riparian vegetation along the perimeter of field.	

Photo No. 3	Date: 5/28/2014
Description: Levee along South River Road (looking east)	

Photo No. 4	Date: 5/28/2014
Description: Levee along South River Road (looking west)	



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N

0 1 2
Miles

Horizon WATER and ENVIRONMENT

- Ferris' milk-vetch
- Mason's lilaeopsis
- Northern California black walnut
- Sacramento perch
- Sacramento splittail
- Sanford's arrowhead
- Suisun Marsh aster
- Swainson's hawk
- burrowing owl
- chinook salmon - Central Valley spring-run ESU
- chinook salmon - Sacramento River winter-run ESU
- giant garter snake
- least Bell's vireo
- longfin smelt
- purple martin
- song sparrow("Modesto" population)
- tricolored blackbird
- Site Parcels
- 1-Mile and 5-Mile site radii

Figure F-2

Special Status Species Occurrences in the Vicinity of the South River Road Property

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N

0 0.125 0.25
Miles

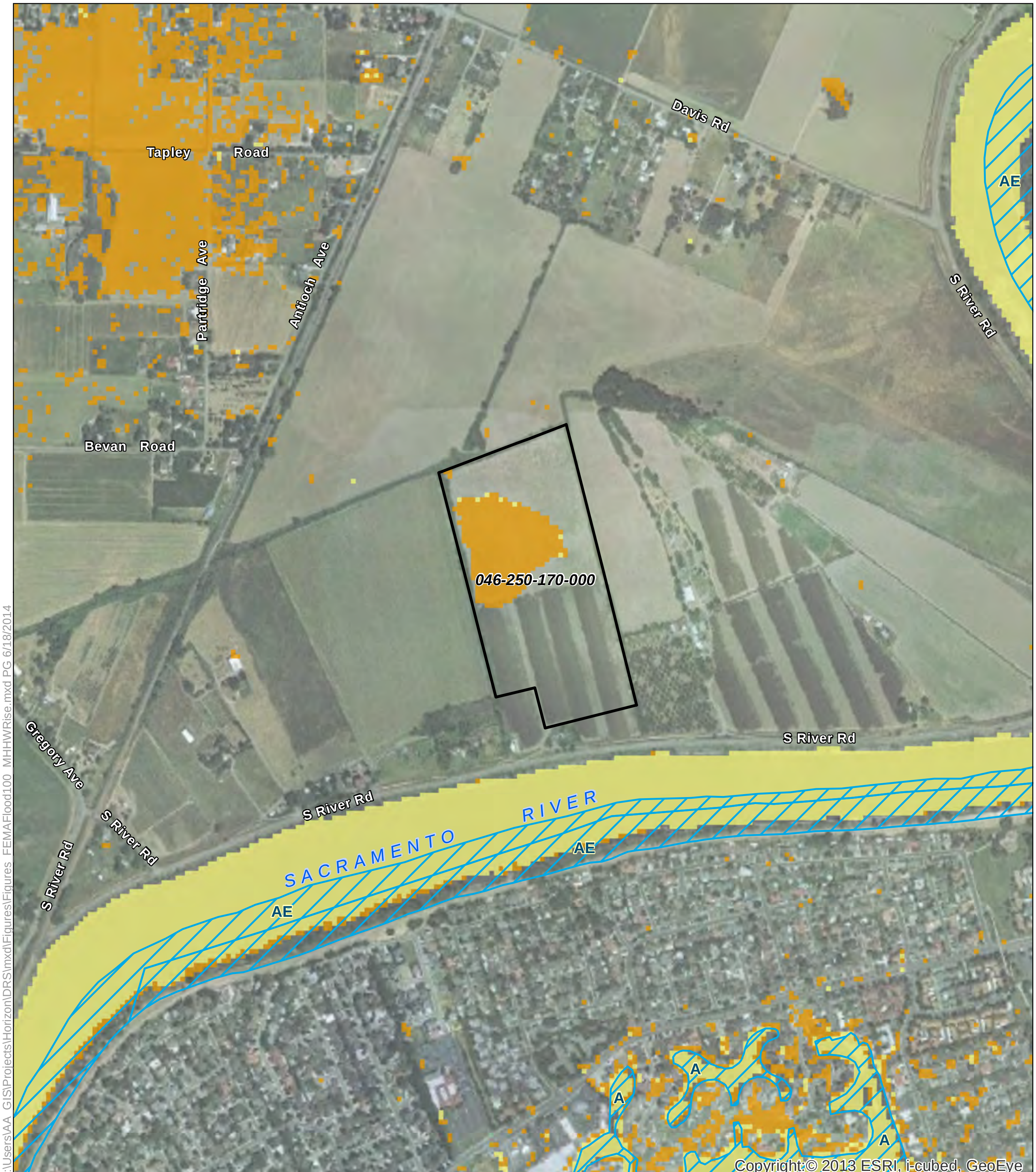
NWI Wetlands and Waters Types

- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Deepwater
- Freshwater Pond
- Lake
- Riverine
- Site Parcels

Source: U.S. Fish & Wildlife Service, 2010

Figure F-3

National Wetland Inventory Map for the South River Road Property



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N

0 0.125 0.25
Miles

Horizon WATER and ENVIRONMENT

100-Year Flood Zone

Zone AE Base Flood Elevations determined.
Zone AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

Site Parcels

Existing Area at or below MHHW

Potential Additional Area at or below MHHW with 55" Sea Level Rise

Flood zone source: FEMA, 2009; 2012; 2013; 2014
Tidal depths source: URS, 2008

Figure F-4

Flood and Sea Level Rise Risk Analysis for the South River Road Property, West Sacramento

Appendix L
GREENHOUSE GAS EMISSIONS REDUCTION PLAN CONSISTENCY DETERMINATION CHECKLIST

This appendix contains DWR's Greenhouse Gas Emissions Reduction Plan (GGERP) consistency determination checklist for the Delta Research Station Project. This checklist demonstrates DWR's GGERP portion of its Clean Air Plan.

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Appendix L
GREENHOUSE GAS EMISSIONS REDUCTION PLAN CONSISTENCY DETERMINATION CHECKLIST

This appendix contains DWR's Greenhouse Gas Emissions Reduction Plan (GGERP) consistency determination checklist for the Delta Research Station Project. This checklist demonstrates DWR's GGERP portion of its Clean Air Plan.

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DWR GHG Emissions Reduction Plan Consistency Determination Form

For Projects Using Contractors or Other Outside Labor

Print Form

California Department of Water Resources
1416 9th Steet
Sacramento, CA
95814
dwrclimatechange.water.ca.gov
www.water.ca.gov/climatechange

This form is to be used by DWR project managers to document a DWR CEQA project's consistency with the DWR Greenhouse Gas Emissions Reduction Plan. This form is to be used only when DWR is the Lead Agency and when contractors or outside labor and equipment are use to implement the project.

Additional Guidance on filling out this form can be found at:
dwrclimatecange.water.ca.gov/guidance_resources.cfm

The DWR Greenhouse Gas Emissions Reduction Plan can be accessed at:
http://www.water.ca.gov/climatechange/CAP.cfm

Project Name:	Delta Research Center - Estuarine Research Station
Environmental Document type:	EIS/EIR
Manager's Name:	John Engstrom
Manager's email:	john.engstrom@water.ca.gov
Division:	Executive
Office, Branch, or Field Division	Under Deputy of Business Operations

Short Project Description:

The California Department of Water Resources (DWR), Department of Fish and Wildlife (DFW), and the U.S. Fish and Wildlife Service (USFWS) are proposing to construct and operate the Estuarine Research Station (ERS), to enhance interagency coordination and collaboration. The research facility would be built in a central location within the Bay-Delta. The ERS is intended to advance the interests of researchers, local communities, and other groups that are dependent on the Bay-Delta by facilitating coordinated monitoring and research efforts on the Bay-Delta's aquatic resources.

The ERS facility would consolidate existing IEP programs. The IEP consists of more than 160 state and federal employees who conduct research activities throughout the Delta region. The facility would build out approximately 110,000 square feet of office, lab, storage, and shop space including a marina with 20 slips.

Project GHG Emissions Summary

Total Construction Emissions	1,138	$mtCO_2e$
Maximum Annual Construction Emissions	653	$mtCO_2e$

☒ All other emissions from the project not accounted for above will occur as ongoing operational, maintenance, or business activity emissions and therefore have already been accounted for and analyzed in the GGERP.

Extraordinary Construction Project Determination

Do total project construction emissions exceed 25,000 $mtCO_2e$ for the entire construction phase or exceed 12,500 $mtCO_2e$ in any single year of construction.

○ Yes - Addition analysis is required, consult with C4

◉ No - Additional analysis not required

Project GHG Reduction Plan Checklist

☒ All Project Level GHG Emissions Reduction Measures have been incorporated into the design or implementation plan for the project. (Project Level GHG Emissions Reduction Measures)

Or

☐ All feasible Project Level GHG Emissions Reduction Measures have been incorporated into the design or implementation plan for the project and and Measures not incorporated have been listed and determined not be apply to the proposed project (include as an attachment)

☒ Project does not conflict with any of the Specific Action GHG Emissions Reduction Measures (Specific Action GHG Emissions Reduction Measures)

Would implementation of the project result in additional energy demands on the SWP system of 15 GWh/yr or greater?

○ Yes ◉ No

If you answered Yes, attach a Renewable Power Procurement Plan update approval letter from the DWR SWP Power and Risk Office.

Is there substantial evidence that the effects of the proposed project may be cumulatively considerable notwithstanding the proposed project's compliance with the requirements of the DWR GHG Reduction Plan?

○ Yes ◉ No

If you answered Yes, the project is not eligible for streamlined analysis of GHG emissions using the DWR GHG Emissions Reduction Plan. (See CEQA Guidelines, section 15183.5, subdivision (b)(2).)

Based on the information provided above and information provided in associated environmental documentation completed pursuant to the above referenced project, the DWR CEQA Climate Change Committee has determined that the proposed project is consistent with the DWR Greenhouse Gas Reduction Plan and the greenhouse gasses emitted by the project are covered by the plan's analysis.

Project Manager Signature:	John Engstrom — Digitally signed by John Engstrom DN: cn=John Engstrom, o=Department of Water Resources, ou=Executive, email=john.engstrom@water.ca.gov, c=US Date: 2015.07.28 11:11:29 -07'00'	Date:	9/15/2015
C4 Approval Signature:	Andrew Schwarz — Digitally signed by Andrew Schwarz DN: cn=Andrew Schwarz, o=California Department of Water Resources, ou=Climate Adapation Unit, email=andrew.schwarz@water.ca.gov, c=US Date: 2015.09.18 10:20:33 -07'00'	Date:	9/17/2015

Attachments:

☒ GHG Emissions Inventory

☐ List and Explanation of excluded Project Level GHG Emissions Reduction Measures

☐ Plan to update Renewable Energy Procurement Plan from DWR SWP Power and Risk Office