Carbon Capture and Mineralization Project

Public Draft

Initial Study

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Prepared for:
City of Pittsburg

Prepared by:
Brezack & Associates Planning

Carbon Capture and Mineralization Project Description

Introduction and Overview

San Francisco Bay Aggregates (SFBA) (Applicant), a wholly owned subsidiary of Blue Planet Ltd. (BP), is proposing to develop, own, and operate a carbon capture and mineralization pilot facility located in Pittsburg, California using proprietary BP technology (Process).

An outlet stream of gas from the gas-fired steam boiler process equipment onsite would provide the source of CO_2 that would be combined with locally sourced recycled/crushed concrete aggregate (RCA), to produce new "CO_2 sequestered" and "upcycled" rock products. Upcycling is the process of transforming by-products or waste materials into new materials or products of better quality or for better environmental value. It is anticipated the final product would exceed ASTM C33 Standard Specification for Concrete Aggregates that defines the quality of aggregate for use in concrete.

These upcycled rock products would be sold to Bay Area businesses, governments and consumers for use in a wide range of low carbon and high performance concrete applications.

This pilot project would be constructed and have the proof of concept operations completed in a total of fifteen months. Ultimately, the proposed project would remove carbon dioxide (CO_2) from a slipstream[1] of flue gas from Calpine's Los Medanos Energy Center (LMEC); however, the transfer of the fluegas to the project area would likely not be ready for use by the pilot project. After completion of the pilot project, BP may decide to pursue a larger operation at the location of the pilot project in the City of Pittsburg or somehwhere else in the region depending on the results of the proposed pilot project. The larger operations would undergo a separate CEQA analysis as additional details beyond the pilot project have not been determined for the expanded operations.

Project Purpose

The proposed project purpose includes:

- Verify that the proof of concept, to produce sustainable construction materials, is viable for investment in a larger facility.
- Use of 100 percent carbon free energy to power the proposed Project.
- Provide pre-marketing volumes of CO_2 sequestered and upcycled rock products for planned construction projects in the Bay Area

The broader objectives of the Project are to substantiate the potential of the following local environmental and economic priorities:

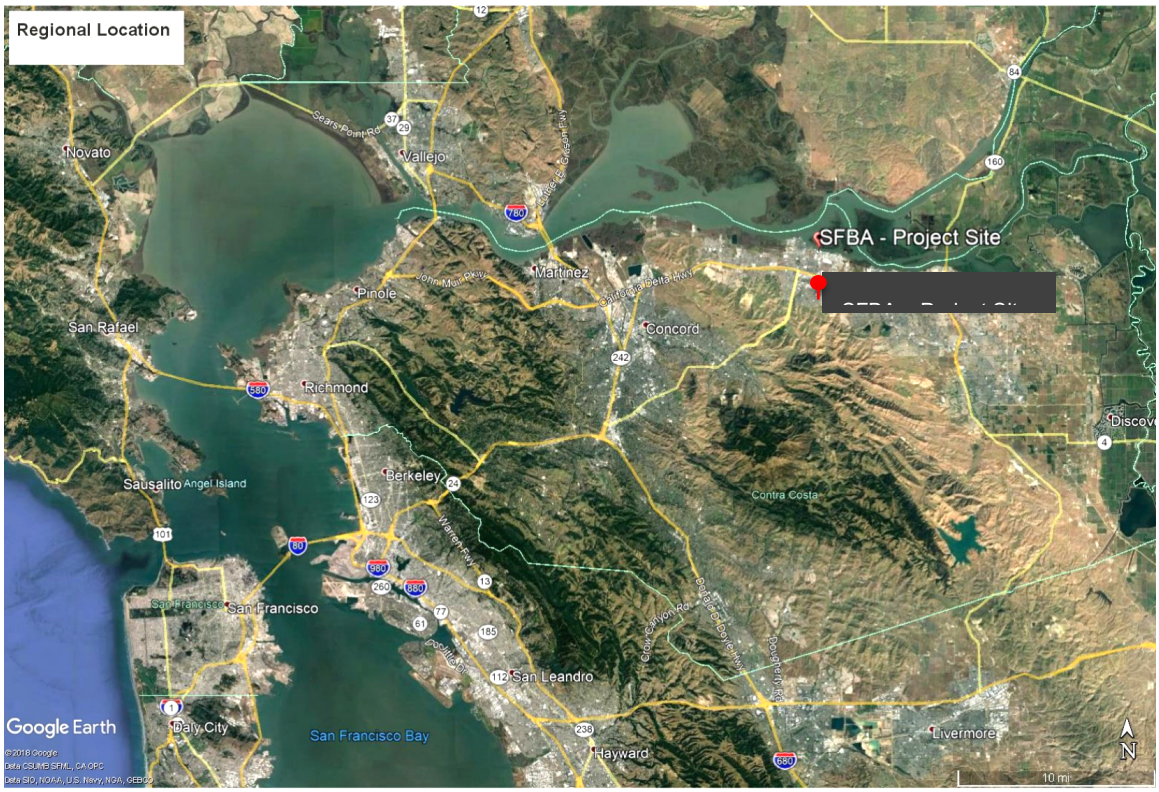
[1] Gas driven by a propellor.

- Reduction in greenhouse gas emissions, specifically CO_2, by the proposed Project for the capture and permanent sequestration of CO_2 from a slipstream of LMEC flue gas.
- Reduction in the environmental impact of quarrying virgin aggregate for construction projects, through remediation and upcycling of RCA from Bay Area construction projects into useable aggregate products.
- Finalize development of BP's technology for capturing and using CO_2 allowing the City of Pittsburg and the greater Bay Area to be a world leader in sustainable construction materials.

Project Location

SFBA intends to construct and operate the proposed Project on a 2.5 acre parcel of land located at 895 East 3rd Street, Pittsburg, California 94565 in Contra Costa County. The Assessor's Parcel Number for the proposed project site is 073-020-019-3. As shown on Figure 1, the parcel is bounded to the north by New York Slough, Suisun Bay, part of the Sacramento-San Joaquin River Delta; to the east by land owned by USS-POSCO Industries (UPI) and by a PG&E substation; to the south by an easement that runs along East 3rd Street; and to the west by Koch Carbon Inc.

Figure 1: Project Vicinity



Project Area Land Use and Development

The Pittsburg General Plan (City of Pittsburg, 2010) designates an approximately 689-acre area as the "Northeast River Planning Subarea." This Subarea is primarily characterized by established, large-scale heavy industrial operations. The proposed project is situated in the northwestern portion of the Subarea.

The Pittsburg General Plan indicates the proposed project area has a land use designation of *Industrial* and is zoned IG (General Industrial) District. The IG designation is the City's heavy industry zoning district that allows for a range of manufacturing, industrial processing, and general services.

Project Setting

The proposed project site was previously host to a 20 megawatt cogeneration power plant, owned and operated by GWF Power Systems Company, Inc. (GWF). The facility was decommissioned in 2012 and the site has since been an empty lot used for truck parking. The proposed project site has a perimeter chain link fence. As shown on Figure 2, two buildings remain in place. Site remedial actions, prior to the construction of the GWF plant, resulted in contaminated soil excavation, consolidation and capping under building floors, asphalt pavements and landscaped areas that remain intact.[2] A Phase 1 environmental site assessment completed in August 2018 by Groundwater & Environmental Services, Inc. verified that the capping infrastructure remains in place sealing any contaminated soil from exposure to the environment and workers.

The property does not abut a public right of way; pedestrian access from the nearest public roadway does not exist. Access to the site is via a private road at the end of the public portion of 3rd Street.

The site provides the following infrastructure that will facilitate operations of the proposed project:

- Close proximity to flue gas input, a small slipstream of which will be diverted from LMEC, a neighbor to the project site at its southwest corner.
- Access to material transport, for raw materials and products, by way of East 3rd Street via standard trucking routes through the City of Pittsburg.
- An existing outfall pipe for discharge of thermal wastewater to the Sacramento-San Joaquin River Delta; previously in use while the GWF power plant was operating, the outfall was verified in December 2018 to be in good working condition.

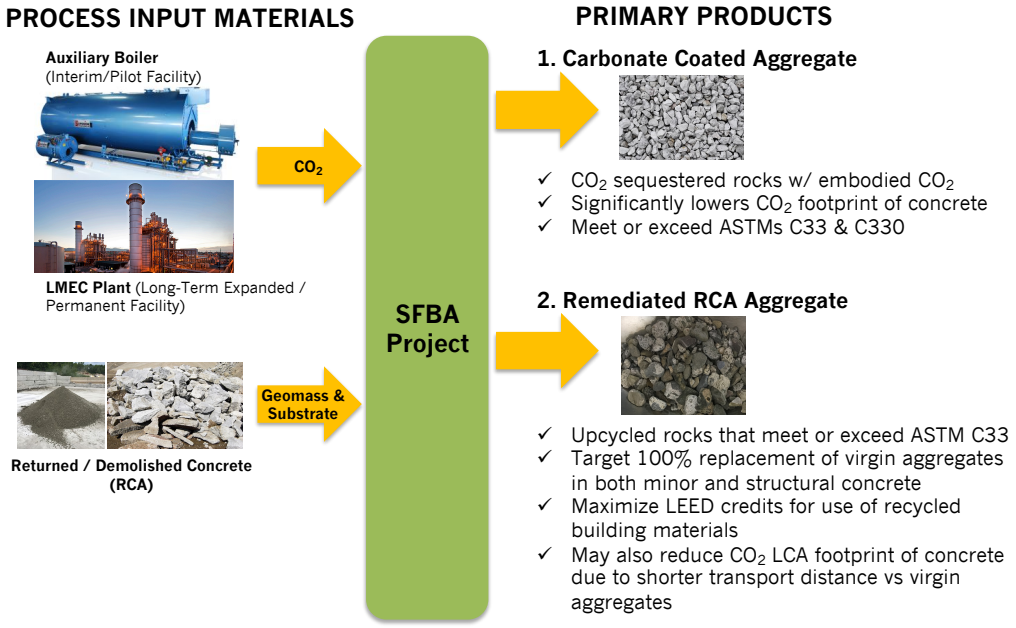
[2] Information located on Envirostor https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=07490047

Figure 2 View of Project Site looking west down 3rd Street.

Project Description

The primary function of the proposed project is to take flue gas from LMEC and RCA feeds from local ready-mix concrete producers and recyclers to produce CO_2 sequestered and upcycled rocks for fresh concrete production as shown on Figure 3 the Process Diagram. On a temporary basis, the CO_2 outlet stream of gas from the gas-fired steam boiler process equipment would be used until the flue gas transfer operations from LMEC is online.

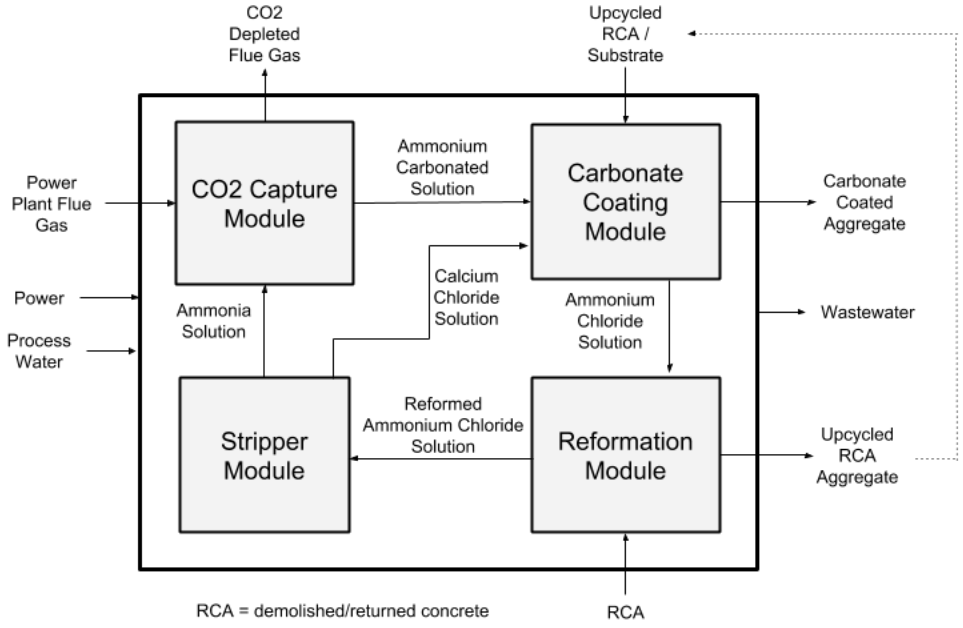
Figure 3 Process Diagram



The proposed project would link together four (4) component modules into a cycle for the overall Process. A module is a set of equipment from which an interim product is produced. Each module is made separately, and the completed modules are joined together to form the process of producing ingredients for fresh concrete production. The four modules are presented on Figure 4 are:

1. CO_2 Capture Module – removal of CO_2 from flue gas,
2. Carbonate Coating Module – calcium carbonate ($CaCO_3$) coating on the surface of the substrate rock,
3. Reformation Module – creation of upcycled rock for coating or placement in fresh concrete, and
4. Stripper Module– separation of aqueous ammonia and calcium chloride solutions for use in the CO_2 Capture and Carbonate Coating modules.

Figure 4 Modules of the Process



Project Construction

The construction of the proposed project would not require any disturbance of soil beneath the existing site caps. The majority of the equipment would be skid mounted for mobilization to and from the proposed project site. No new foundation construction or new buildings would be constructed.

The duration of construction of the proposed project is estimated to be 3 to 4 months. It is estimated that a maximum of six (6) construction workers are required. Construction activity entails off-loading transported equipment and connecting the separate Modules together. Equipment used during construction would include:

- Forklift,
- Loader,
- Dump truck, and
- Transporter truck.

Staging areas and parking of worker vehicles would be contained to the 2.5 acre project site. A mobile office trailer would be installed for use during the operation of the proposed project. ADA parking and accessible portable restrooms would be set up during construction.

There are no planned changes to the existing site drainages. No new impervious surfaces are planned. Sediment barriers would be added to the existing drop inlets and would follow standard protocol:

1. Sandbags shall be laid tightly together.
2. Trapped sediment would be removed after each storm event and any required repairs made promptly thereafter.
3. Down slope elevations must be greater than the ponding height to prevent runoff from bypassing the inlet. A sandbag dike on the down slope may be necessary to prevent bypassing of the inlet as determined during operations.

Proposed Operations

Up to three (3) people per shift would be required to operate the Facility. There would be one eight (8) hour shift per day. Operations would include occupancy of one of the existing buildings onsite. The proposed project would run the four (4) component modules that can operate continuously during the eight hour shift or in batch mode. This section describes the details of each module presented in Figure 4.

CO_2 Capture Module

In this module, the LMEC flue gas and aqueous ammonia (NH_3) solution from the Stripping Module are blended in gas scrubbing equipment to remove CO_2 from the flue gas. The resulting aqueous ammonium carbonated solution (mixtures of aqueous ammonium bicarbonate (NH_4HCO_3) and of aqueous ammonium carbonate ($(NH_4)_2CO_3$) serves as a feed into the Carbonate Coating Module.

Carbonate Coating Module

In this module, captured CO_2 from the flue gas is removed from the Process. Aqueous ammonium carbonated solution from the CO_2 Capture Module and aqueous calcium chloride ($CaCl_2$) solution from the Stripper Module are streamed into a rotating drum containing a substrate rock, sourced either as quarried rock or as upcycled rock from the Reformation Module. As the materials move through the length of the drum, a solid calcium carbonate ($CaCO_3$) coating forms on the surface of the substrate rock; any $CaCO_3$ formed, but not coated on the substrate produces precipitated $CaCO_3$. The resulting CO_2 sequestered products are washed with recycled water and are sent to market for placement in fresh concrete. Aqueous solution remaining from the coating drum contains ammonium chloride (NH_4Cl) salt and this solution is piped to the Reformation Module.

Reformation Module

This module uses aqueous ammonium chloride solution from the Carbonate Coating Module to extract calcium ions (Ca^{2+}) and alkalinity (O^{2-}) from demolished/returned concrete feed. Mixing of these constituents in a drum yields remediated

demolished/returned concrete rocks and reformed ammonium chloride solution. The upcycled rocks are either (i) used as substrate rock in the Carbonate Coating Module or (ii) washed with recycled water and sent to market for placement in fresh concrete. The reformed ammonium chloride solution, that now contains calcium chloride and free ammonia, flows to the Stripper Module for separation. Wastewater generated from the washing of material products would be minimized using recycling of water on-site.

Stripper Module

Aqueous ammonia is separated or stripped out of the reformed ammonium chloride solution that comes from the Reformation Module. The pilot project may validate different methods of stripping; conventional stripping processes are driven by heat, for example, by using process steam produced from a separate boiler unit; other techniques such as vacuum distillation and air stripping may be used to separate the reformed ammonium chloride solution into aqueous ammonia and calcium chloride solutions. After separation, and to essentially complete the circular cycle of the overall Process, the former is condensed ahead of flowing to the CO_2 Capture Module, while the latter is flowed to the Carbonate Coating Module.

Figure 5 includes the detailed list of each piece of equipment included in each of the four modules.

Figure 5 Module Components

CO2 Capture Module	- Forced draft fan - Gas-liquid contactors - Contactors heat exchanger - Contactor ammonia pump - Ammonia scrubber - Stack	
Carbonate Coating Module	- Substrate hopper - Substrate vibratory feeder - Aggregate dray conveyor - Substrate belt conveyor - CaCO3 thickener clarifier - Thickener pump	- Vacuum dryer - Wash water pump - Product screen - Product bins
Reformation Module	- RCA unloading hopper - RCA feeder - Reformation drum - Separation conveyor - Reformation pump - RCA thickener clarifier	- Thickener pump - Vacuum dryer - Reformed solution tank - Ammonium chloride tank
Stripper Module	- Stripper column - Thermosyphon reboiler - Ammonia condenser - Calcium chloride storage tank - Calcium chloride pump - Stripper heat exchanger	- Ammonia surge tank - Ammonia pump - Gas-fired steam boiler

Process Input

Existing utility service and/or are service connections in place include gas, electric, potable and non-potable water hookups, as well as an existing outfall pipe that extends into New York Slough.

Flue Gas

The ultimate process of obtaining flue gas involves a tie-in pipeline to one of LMEC's flue gas stacks and a pipeline to transport the flue gas through LMEC's site across East 3rd Street to the project site. The Applicant anticipates the timing of getting the slipstream of flue gas to the project site from LMEC may delay the project schedule. Therefore in the interim, the project would use the outlet stream of gas from the gas-fired steam boiler process equipment as an interim source of CO_2 input to the Facility. A blower would be used to move the outlet gas from the gas-fired steam boiler through an air-cooled heat exchanger that conditions the gas before it enters the process equipment for CO2 removal. This boiler supplied flue gas is similar to what would be delivered in a slipstream from LMEC. The onsite boiler gas would allow the project operations to be initiated while the slipstream of flue gas from LMEC is being connected to the facility.

Water

The Process would use non-potable water for non-contact process cooling, washing of material products, and to replace evaporative losses of process water. SFBA plans to source non-potable canal water from UPI, via their water rights to the 47 mile Contra Costa Canal aqueduct that runs through central Contra Costa County. The canal is managed by the Contra Costa Water District (CCWD) and is delivered to UPI through a two-mile pipeline system owned and maintained by UPI. UPI also owns and operates a filter plant at its facility in Pittsburg, located to the south and to the east of the project site, through which it treats all canal water received from the CCWD. UPI controls an existing 6-inch pipe (previously constructed by GWF) running from its facility to the project site. It is estimated that a 1-inch meter would be needed to measure the quantities of water delivered to the project.

The Facility would use a closed process water loop for cooling; this process water does not come in direct contact with any other water in the Facility. It is anticipated that during operations the Facility would use less than 30 gallons per minute (gpm) of water to wash the products, with less than 10% of this volume being used as mist for dust control. In addition, the estimated quantity of make-up water during operations is less than 50 gpm and is anticipated to come from the UPI non-potable water and from City water.

Gas & Electric

Pacific Gas & Electric (PG&E) has gas and electric hookups at the site. The last "new construction" was in 2013 (for electric) and the site was last inspected by PG&E in 2014. The main electric connection is 400A/480V/3-phase with meter (currently in service), and the site does have additional single phase meters. It is anticipated that the Process would be powered with 100% renewable electricity available from the grid through the City of Pittsburg's participation in Contra Costa County's CCE program provided by MCE Contra Costa.

The project would use a gas steam boiler to help drive the Stripper Module component of the Process. The existing gas infrastructure to the site consists of a 230 foot, 3-inch steel pipeline from the main with delivery of 15/80 PSI; it was cut and capped in 2012 and would need a meter installed to start service.

Chemical Storage and Use/Safety Procedures

All chemicals delivered to the site in bulk quantities would be stored in fully contained bulk storage tanks and/or storage vessels having a capacity of less than 260 gallons (or as otherwise restrained by vapor pressure requirements, types of materials stored, etc.). All chemical storage, handling, and feed facilities would be designed, constructed, and maintained in compliance with all applicable governmental codes and regulations. California law requires the Project Applicant, as the operator of the facility, to submit a Hazardous Material Business Plan (HMBP), that describes in detail the type and volume of chemicals to be used at the facility, to the Contra Costa Health Services - Hazardous Materials Programs (CCHSHMP). The CCHSHMP is the Certified Unified Program Agency (CUPA) for Contra Costa County.

The HMBP must include a reporting and monitoring process for any spills that may occur. It also must include requirements for safety equipment, automatic shut-off valves, and other safety procedures that may be required, depending on the types and volumes of chemicals stored and used. The potential for facility upset conditions and accidents would be minimized with design of secondary containments sized to confine the entire contents of stored chemicals, proper training of operators, and having an emergency response plan in place that outlines procedures to quickly react in the event of an accident or spill. Chemicals and other inputs used in the Process are listed in Table 1. All chemical storage would include secondary containment.

Table 1 Chemicals and Quantities Stored Onsite

Chemical	Common Name, Physical State	Approximate Storage Volume	Location of Chemical Addition
NH_4Cl	Ammonium chloride, solid	One (1) pallet or roughly 2,200 lb; 40 x 50 lb bags	Reformer Module
NH_3	Ammonia, 0.5 to 19 wt% aqueous solution	One (1) tank of less than 260 gal; less than 2,100 lb	CO_2 Capture Module
HCl	Hydrochloric acid, 30% aqueous solution	One (1) tank of less than 260 gal; less than 2,500 lb	CO_2 Capture Module, Carbonate Coating Module
$CaCl_2$	Calcium chloride, solid	One (1) pallet or roughly 2,200 lb; 40 x 50 lb bags	Carbonate Coating Module
n/a	Waste concrete aggregate, solid	Two (2) piles or roughly 25 cubic yards; 17 ft. w x 17 ft. l x 5 ft. h piles	Reformer Module

A Site-Specific Safety Plan to address safety issues specific to the facility would be developed and be consistent with the existing Safety Program and Policies in the SFBA Safety Plan. The plans would be developed as part of the Site-Specific Safety Plan for the project and include:

- Scope of Project,
- Health & Safety Responsibilities,
- General Safety Procedures,
- Jobsite Safety Procedures, and
- Safety Program & Policy Limitations.

The Project would include the development of an industrial fire safety plan consistent with applicable standards and fire codes. Fire systems that would be in place include fire extinguishers, fire sprinkler and smoke and fire alarm systems as required, as well as exit signs and emergency lighting. Any additional access lighting required for personnel and for security would consist of permanently mounted fixtures secured to structures, equipment, walls, and poles as required, and would be designed to provide nighttime lighting levels consistent with applicable standards.

Process Output

Figure 3 illustrates the primary function of the Project operations to use flue gas and RCA feeds to produce CO_2 sequestered and upcycled rocks for incorporation into fresh concrete. Several other byproducts, produced during the Process, are discussed below.

Treated Flue Gas

The treated flue gas, depleted of CO_2 during the Carbon Capture Module, would be scrubbed by a secondary set of gas scrubbing equipment. This scrubbing equipment would be located just upstream of the stack to recover any fugitive ammonia vapor. The remains of the treated flue gas would then be exhausted through the stack into atmosphere.

Wastewater

The estimated maximum thermal wastewater generated during operations is 50 gpm that would be discharged through the existing outfall at the site. Wastewater from washing and rinsing of product material, anticipated to be less than 30 gpm, would be collected and sent to the City sewer system in accordance with the City of Pittsburg's Clean Water Program.

Water used for cooling in the Process would be discharged through the outfall pipe that exits at the northeast corner of the project site into New York Slough for 12 months from the time of the initial operations of the pilot project. The average discharge would be 24,000 gallons per day and the maximum discharge would be 72,000 gallons per day. The discharge to the Slough would not come into direct contact with the facility processes. Any thermal wastewater discharge to the River Delta would adhere to San Francisco Bay Regional Water Quality Control Board's Thermal Plan that prohibits thermal waste discharges with a maximum temperature greater than 4 °F above ambient temperature of the receiving water. Other wastewater generated from the washing of material products

would be minimized, utilizing recycling systems on-site and storing collected wastewater in tanks for treatment prior to disposal.

Wastewater discharges would be monitored according to the relevant limit values for specific parameters outlined in compliance documents received during the permitting process. The parameters are anticipated to include temperature, hardness, total chlorides, conductivity and metals. Monitoring of the wastewater would be done at least one (1) time during the planned 6-9 month operational duration, likely just after commissioning of the Facility and, if deemed necessary, after approximately 500 hours of the Facility being in operation.

Monitoring would consist of internationally accepted standardized sampling, analysis, and quality assurance methods (e.g., ISO standards). Analyses would use the State Water Board's Thermal Plan (for thermal wastewater discharge) and the City's urban wastewater treatment (for discharge to sewer) for exceedance thresholds.

Solid Waste

The trash enclosure is sized to accommodate a dumpster with at least ten (10) cubic yards of capacity. The municipal waste service provided by Mt. Diablo Resource Recovery would empty this dumpster as needed during construction. All products from the Facility are anticipated to be used as construction materials in building products; any other solid waste from operations would be contained in the dumpster in the trash enclosure and would be emptied as scheduled with Mt Diablo Resource Recovery.

Gas Emmissions

The use of aqueous ammonia solution in the process results in the potential for emissions from two sources. The first is from unreacted ammonia in CO_2 depleted flue gas in the CO_2 Capture Module and the second is from fugitive ammonia vapors from the Process. The project would use a combination of the following techniques to manage odorous ammonia emissions:

1. Installation of gas seals on equipment associated with ammonium ions or free aqueous ammonia.
2. Carbonate Coating Module would operate at slight negative pressure.
3. Any process modules that use ammonia would have its equipment contained in an enclosure with extraction/emission to a single point to manage odor.
4. Scrubbing equipment upstream of the stack to recover any fugitive ammonia vapor before release of treated flue gas through the stack.
5. Gas tight piping would be used to interconnect the equipment that requires gas flow through.

Materials Storage and Transport

The project would receive inbound RCA as a raw material input and would produce carbonate coated rocks and upcycled RCA as the primary products outbound to the concrete market clients. Supplementary cementitious material (SCM) also heads outbound to market.

Input and product materials would be stored outdoors in managed piles, two for each. Each pile would be surrounded by berms to prevent precipitation runoff from discharging off site. Front-loaders would move material to and from the component modules or the truck loading and unloading areas. The storage and loading operations would use water-to manage dust. The site would allow space for up to one week's worth input material and product material. However, in stable operation, the input material and product material would arrive and leave on a 1:1 rotation and require minimal storage. Potential locations for material storage onsite run along the north perimeter of the property and include both its northeast and its northwest corners.

The projected daily volume of inbound and outbound material movement at the project site is provided in Table 2. The Applicant is planning for inbound trucks to travel east along East 3rd Street and enter the project site at the east gate, while outbound trucks leave the site at the west gate and travel west along East 3rd Street. The Applicant anticipates inbound and outbound trucks to access East 3rd Street from Harbor Street via standard trucking routes through the City of Pittsburg. To minimize the cost and the impact to the City of Pittsburg from transportation of material, the hauling plan is for trucks to complete round trips to and from the project site with "full" loads; assuming 20 US ton (10 yd^3) per truck. As little as 15% of the total truck trips are estimated to be empty, total throughput of material is 2.6 yd^3/hr. During an 8-hour day of operation that equates to roughly three (3) round trip trucks per day for a total of 6 vehicle round trips per day in combination with worker's travel to and from the project site.

Table 2 Projected Daily Volume of Material Movement.

Material Type[3]	Throughput Capacity	Truck[4] (No./day)
CO_2	221 lb/hr	n/a
Inbound RCA	2.5 yd^3/hr	2.3
Coated Product	1.3 yd^3/hr	1.2
Upcycled RCA	1.1 yd^3/hr	1.0
SCM	0.1 yd^3/hr	0.1
TOTAL Throughput	**2.6 yd^3/hr**	**3.0**

[3] Coated Product, Upcycled RCA and SCM are outbound products produced from Inbound RCA input material.

[4] Assumes 8 hours per day of operation, 20 US ton (10 yd^3) per truck and 15% of truck trips are empty; no./day rounded up to nearest 0.1; TOTAL assumes Coated Product, Upcycled RCA and SCM.

Figure 6 is an aerial view of project site with proposed truck route inside the fence of the project site denoted in green.

Figure 6 Onsite Truck Route

Noise

The materials handling process equipment would generate some noise, it is not anticipated that the noise level would exceed 85 dBA (adjusted decibels) during an eight (8) hour exposure time.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project. The following pages present a more detailed checklist and discussion of each environmental factor.

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

DETERMINATION:

On the basis of this initial evaluation:

☐	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
☒	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
☐	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
☐	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.
☐	I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required

Signature: 	Date: July 8, 2019
Printed Name: Hector Rojas	For: City of Pittsburg

1.1 AESTHETICS

Except as provided in Public Resources Code Section 21099, would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway	☐	☐	☐	☒
c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?	☐	☐	☐	☒
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

Discussion

Would the proposed project:

a) Have a substantial adverse effect on a scenic vista?

No Impact. Scenic or visual resources are generally defined as both the natural and built features of the landscape that contribute to the experience and appreciation of the environment by the general public. A scenic resource may also represent a landmark or area that has been noted for its outstanding scenic qualities and is thereby protected by State or local plans because of those qualities. The existing visual character of the surrounding locale is primarily industrial, and the project site is not located within or along a designated scenic corridor. Views in the vicinity of the Project site are largely constrained by adjacent structures, to the west by Koch Carbon Inc., by a PG&E substation and by land owned by USS-POSCO Industries (UPI) to the east; to the south by an easement that runs along East 3rd Street. The relatively flat topography of the subject site and distance between the water and East 3rd Street do not provide valuable public views of the water. The existing project site is an empty lot used for truck parking. The property does not abut a public right of way; pedestrian access from the nearest public roadway does not exist. Access to the site is via a private road and locked gate at the end of the public portion of 3rd Street.

The proposed materials handling process equipment and material stockpiles would be visible to the public from the designated scenic waterway, Suisun Bay. However, the Project site does not contain any scenic vistas nor would construction of the proposed facilities adversely affect views from Suisun Bay, due to the existing industrial character of the Project Site. In addition, compliance with the City of Pittsburg Zoning Ordinance requires the City Planning Commission to review the design of the proposed structures to protect the aesthetic and visual character of the area. There would not be any impacts related to scenic views from Suisun Bay.

b) Substantially damage scenic resources, including, but not limited to, tress, rock outcroppings, and historic buildings within a state scenic highway?

No Impact. Scenic resources refer to historic buildings, urban skylines, or natural resources, such as mountain ridgelines, trees, or rock outcroppings. There are no scenic resources within the project site. As a result, the proposed project would have no impact on scenic resources.

c) In non-urbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that are experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?

No Impact. The existing industrial character on East 3rd Street would not be altered by the proposed project during construction or operations because the facilities would blend into the existing environment. The Pittsburg General Plan indicates the proposed project area has a land use designation of *Industrial* and is zoned IG (General Industrial) District. The IG designation is the City's heavy industry zoning district that allows for a range of manufacturing, industrial processing, and general services. The proposed project would not substantially degrade the existing character or quality of the site and its surroundings. The project would not conflict with applicable zoning and other regulations governing scenic quality and therefore there would be no impacts to aesthetic resources**.**

d) Create a new source of substantial light or glare, which would adversely affect day or nighttime views in the area?

Less Than Significant Impact. Additional access lighting required for personnel and for security would consist of permanently mounted fixtures secured to structures, equipment, walls, and poles as required, and would be designed to provide nighttime lighting levels consistent with applicable standards. There is no light- or glare-sensitive land uses within proximity of the project site. The closest public roadway is East 3rd Street, and is occupied by industrial uses. Although additional lighting would be introduced to the project site, the proposed project would comply with Title 18 of the Pittsburg Municipal Code (PMC). Section 18.82.030(B) sets forth performance standards for outdoor lighting to be indirectly or diffused or be shielded or directed away from residential areas and requires City review of the building plans. As a result, the proposed project would have a less-than-significant impact on day or nighttime views of the area because the City would review per the requirements of PMC Title 18 to ensure that the performance standards are met.

1.2 AGRICULTURAL AND FOREST RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

Discussion

Would the proposed project:

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

No Impact. The proposed project would be constructed in developed industrial land that contains no farmlands. As a result, the project would have no impact related to the conversion of agricultural land uses to non-agricultural land uses.

b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?

c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?

d) Result in the loss of forest land or conversion of forest land to non-forest use?

e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?

b. – e. ***No Impact.*** The proposed project would not conflict with existing zoning for, or cause rezoning of, forest loss or conversion of forest land to non-forest use or involve other changes that could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest use. Forest land is not present in the vicinity of the proposed project. Therefore, the proposed project would have no impacts on forest land.

1.3 AIR QUALITY

Where available, the significance criteria established by the applicable air quality management district or air pollution control district may be relied upon to make the following determinations.

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard?	☐	☐	☒	☐
c) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
d) Result in other emissions (such as those leading odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

Discussion

An Air Quality Conformity Assessment (Assessment) was completed for the proposed project in May 2019. The Assessment in Appendix A provides applicable regulations, project setting, assumptions, references used, and detailed methods that were applied to determine significance of the air quality criteria. The following is a summary of the setting and applicable federal, state and local standards that apply to air quality. The impact discussions include a summary of the Assessment modeling results and calculations used to determine emissions from the proposed project's construction and operations.

The project site is located in the eastern area of the San Francisco Bay Area Air Basin (SFBAAB). The Basin is in attainment for federal standards of CO, SO_2, and NO_2, and in nonattainment or unclassified status for O_3, PM_{10}, and $PM_{2.5}$.

The climate within the region is characterized by warm, dry summers and mild, wet winters; it is dominated by a semipermanent high-pressure cell located over the Pacific Ocean which generates seasonal cloud-cover variation over the course of the year. This high-pressure cell drives the dominant onshore circulation, as can be seen in Figure 1, and helps to create two types of temperature inversions, subsidence and radiation, that contribute to local air quality degradation.

Figure 1: Project Air Basin Aerial

In the area of the proposed project site, the maximum and minimum average temperatures are 90º F and 39º F, respectively. Precipitation in the area averages approximately 16 inches annually, 90 percent of which falls between November and April. Fog can occasionally develop during the winter. The prevailing wind direction at the project site is from the west-southwest, with an annual mean speed of 3 to 5 miles per hour. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of onshore sea breezes. The overall result is a noticeable degradation in local air quality.

The project is expected to have a lifetime of approximately 15 months (three to four months construction time and 12 months operational time) commencing in the latter half of 2019. The analysis presented is a worst-case analysis for construction and material handling operations constitutes the worst-case onsite pollutant-generating scenarios for the pilot program.

The State (i.e., BAAQMD) standards are equal to, or more stringent than, the Federal Clean Air standards. Development of the proposed project would therefore fall under the stricter BAAQMD guidelines.

As part of its air quality permitting process, BAAQMD has established thresholds for the preparation of Air Quality Impact Assessments (AQIA's) and/or Air Quality Conformity Assessments (AQCA's). The applicable standards are shown in Table 1.

Table 1: Thresholds of Significance for Air Quality Impacts

Pollutant	Thresholds of Significance (Pounds per Day)	Clean Air Act Significance Levels (Tons per Year)
Carbon Monoxide (CO)	*See Note 1*	100
Oxides of Nitrogen (NO_x)	54	50
Particulate Matter (PM_{10})	82	100
Particulate Matter ($PM_{2.5}$)	54	100
Reactive Organic Gasses (ROG's)	54	50
Oxides of Sulfur (SO_x)	*See Note 2*	100
Volatile Organic Compounds (VOC's)	*See Note 2*	50

Notes:

1. Operational CO levels based on measured or predicted concentrations equal to 9.0 ppm (8-hour average), 20.0 ppm (1-hour average). There is no construction-related threshold.
2. The District has no standard for this pollutant.

Source: BAAQMD CEQA Air Quality Guidelines, 5/17.

The City of Pittsburg accepts the use of these numerical "screening criteria" as "Thresholds of Significance" for the purposes of CEQA analysis. In the event that project emissions may approach or exceed these screening level criteria, modeling would be required to demonstrate that the project's ground-level concentrations, including appropriate background levels, are below State Ambient Air Quality Standards. If emissions exceed the allowable thresholds, additional analysis is required by the State to determine whether the emissions would exceed an ambient air quality standard.

Would the proposed project:

a) Conflict with or obstruct implementation of the applicable air quality plan?

No Impacts. The Bay Area Air Quality Management District (BAAQMD) adopted the Bay Area 2017 Clean Air Plan in April 2017 (2017 Plan). The 2017 Plan provides a comprehensive strategy to improve air quality, protect public health, and protect the climate, using the tools and resources available to the BAAQMD. The Plan offers a long-range vision describing how the Bay Area could look and function in a year 2050 post-carbon economy, and describes a comprehensive control strategy that the Air District will implement over the next three to five years, from the time of the Plan's adoption, to protect public health and the climate, while setting the region on a pathway to achieve the 2050 vision. (BAAQMD 2017a)

The proposed project is a proof of concept for the sequestration of carbon into building materials using renewable energy and recycled water when feasible. A successful project would result in reduction of mining of raw materials for construction as well as support the BAAQMD 2017 Plan for a post-carbon future. Therefore, the project would not impact applicable air quality plans.

b) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard?

Less Than Significant Impact. The proposed project site has a maximum working footprint of roughly 2.5 acres or 108,029 square-feet (10,036 m^2) based upon data obtained from the project site plans. The aggregate project emission rates for the various criteria pollutants are shown in Table 2 and constitute the

input parameters under the SCREEN3 air dispersion model. Given this input data, the expected combustion-fired construction emission concentrations of the proposed project are shown in Table 3.

TABLE 2: Predicted Onsite Diesel-Fired Emission Rates

Criteria Pollutant	Max Daily Aggregate Emissions (pounds)	Daily Site Emission Rates (grams/second)	Average Area Emission Rates (grams/m^2/second)
CO	12.7	0.0666	6.6334E-06
NO_x	31.5	0.1652	1.6458E-05
SO_x	3.6	0.0190	1.8918E-06
PM_{10}	**0.9**	**0.0045**	**4.4946E-07**
$PM_{2.5}$	0.8	0.0042	4.1536E-07
ROG	4.0	0.0212	2.1105E-06

Total averaging time is 24 hours (86,400 seconds) per CAAQS standards. The area emission rates are shown in scientific notation. Values include contributions of all construction, powered haulage, and material handling activities.

TABLE 3: SCREEN3 Predicted Diesel-Fired Emission Concentrations

Criteria Pollutant	Pollutant Concentration ($\mu g/m^3$)	Pollutant Concentration (ppm)[1]	Pollutant Risk Probability (percent risk per person for 70-year exposure)	Significant?
CO	36.40	0.0317	n/a	No
NO_x	90.30	0.0480	n/a	No
SO_x	10.38	0.0040	n/a	No
PM_{10}	**2.47**	**- -**	**0.074%**	**No**
$PM_{2.5}$	2.27	- -	n/a	No
ROG	11.58	- -	n/a	No

Diesel risk calculation based upon ARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics inhaled in a 70-year lifetime. $PM_{2.5}$ levels based upon the California Emission Inventory Development and Reporting System (CEIDARS) database fractional emission factor for diesel construction equipment of 0.920 $PM_{2.5}$ / PM_{10}.

1 Conversion Factors (approximate): CO: 1 ppm = 1,150 µg/m3 @ 25 deg-C STP, NOx: 1 ppm = 1,880 µg/m3 @ 25 deg-C STP, SOx: 1 ppm = 2,620 µg/m3 @ 25 deg-C STP, PM10 and PM2.5: 1 ppm = 1 g/m3 (solid).

The estimated equipment diesel exhaust emission tabulations from construction and material handling are provided in Table 4a. Table 4b provides an estimate of powered haulage emissions associated with material import for the pilot plant process and haulage export of finished product, assumed to comprise a total of four (4) round trips at 110 miles each (i.e., 440 VMT) for a heavy duty diesel truck classification (CARB classified MH DSL category). Based upon the findings from the SCREEN3 air dispersion model, no significant diesel construction vehicle or powered haulage air quality impacts are expected.

TABLE 4a: Predicted Onsite Diesel Engine Emissions

Equipment Type Model	Quantity Used (#)	Aggregate BAAQMD Criteria Pollutants (Pounds/Day)					
		CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	ROG
CAT 2PD5000 Forklift	1	1.7	3.1	0.4	0.1	0.1	0.4
JD 644E Loader	1	5.2	9.7	1.3	0.3	0.3	1.4
CAT CT610 Dump Truck	1	2.3	6.1	0.8	0.1	0.1	0.9
Peterbuilt 348 Transport Truck	1	3.2	8.5	1.1	0.2	0.2	1.2
Sum:	**4**	**12.4**	**27.4**	**3.6**	**0.8**	**0.7**	**4.0**
BAAQMD Significance Threshold:		**- -**	**54**	**- -**	**82**	**54**	**54**

TABLE 4b: Powered Haulage Emissions due to Material Import for Processing

		Criteria Pollutants Under Examination (in pounds per day)					
Powered Haulage	**VMT**	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Heavy Duty Truck Haulage Totals (MH DSL):	440	0.29	4.02	0.01	0.10	0.09	0.06
BAAQMD Significance Threshold:	--	--	54	--	82	54	54

Construction and material handling activities during operations are a source of fugitive dust emissions that may have a substantial, but temporary, impact on local air quality. Substantial dust emissions also occur when vehicles travel on paved and unpaved surfaces, and haul trucks lose material. For the project, overall minimal surface grading operations associated with either process equipment placement during the initial construction phase (previously estimated to be approximately 90 days, or 3 months of the 3 to 4 month construction period), and material handling during the operational pilot phase (estimated at 360 days, or 12 months), are anticipated as being no greater than a worst-case 6,000 cubic-yards of material moved, or an approximate 20 cubic yards per average work day that the facility would be permitted to construct and operate.

For fine aggregate material similar to what would be processed at the project site, the expected material movement would equate to approximately 7,800 standard tons over the totality of the project. Assuming a 60-percent estimate as a percentage of the working material capable of generating respirable PM_{10} yields a daily material working weight of 10.4 tons per day over the assumed 450 total operational days of the facility. The volume of working material would produce a predicted dry material level of 0.7 pounds per

day of PM_{10}, or 0.3 pounds of PM_{10} per day was determined based on an assumed surface wetting three times a day. This level is far below the 82 pounds per day threshold established by the BAAQMD. Therefore, no significant impacts are expected from movement of materials on ground surface.

The majority of the equipment onsite would be used for both construction and operations of the project. Travel on dust overlaid surfaces, due to construction and operational activities onsite would include workers' vehicles moving onsite traversing a total of five (5) miles per day (VMT) during the earthwork and site preparation phases. A level of 4.6 pounds of PM_{10} was predicted to be generated per day. The commensurate $PM_{2.5}$ level would be 0.1 pounds per day, which is also below the proposed threshold of significance of 54 pounds per day for this pollutant.

Examination of diesel toxics previously shown in Table 3 found that all criteria pollutants were below the recommended health risk level with a PM_{10} risk probability of 0.074% (0.00074 in one million) per 70-year exposure duration, assuming the implementation of Toxics Best Available Control Technology (T-BACT). The analysis identified a worst-case PM_{10} level of 2.47 $\mu g/m^3$ occurring at a distance of 138 meters (453 feet) from the project site. This pollutant concentration is below the California Ambient Air Quality Standard (CAAQS) of 50 $\mu g/m^3$ established by the State for any given 24-hour exposure period. Given these findings, no significant carcinogenic impact potential from PM_{10} would be expected due to proposed operations.

Anticipated diesel-fired $PM_{2.5}$ levels would not be expected to exceed 2.27 $\mu g/m^3$, which is also below the Federal NAAQS 24-hour threshold of 35 $\mu g/m^3$ (there are no State concentration threshold for this pollutant). No cumulative contribution of $PM_{2.5}$ from the site would be physically possible due to the reasons cited above. The project was additionally found to be in compliance with both the BAAQMD 8-hour and 1-hour CO thresholds with a maximum value of 0.03 ppm.

Operational fixed emission sources under the context of this pilot project would consist of the following two scenarios:

- Scenario 1 assumes that the project would utilize the excess flue gas from the Calpine LMEC site as the source of CO_2 generation in the operations of the pilot process, and,
- Scenario 2 assumes that the project would operate a registered 6.3 MBtu/hr natural gas boiler onsite as discussed in the Project Description until the flue gas in Scenario 1 is accessible.

Only one scenario would ultimately be selected as the CO_2 source for the carbon capture and mineralization process of the pilot plant. Each of these scenarios is shown below in Table 5 along with the worst-case estimate for each criterion pollutant examined.

TABLE 5: Applicant Predicted Operational Emissions

Scenario	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	ROG/VOC
Scenario 1: Flue Gas Extraction	2.80	1.92	0.00	0.86		0.37
Scenario 2: Onsite Boiler Utilization	5.76	2.72	0.00	1.13		0.82
Material Handling Dust Emissions				0.45	0.05	
Maximum Emissions Pounds/Day	**5.76**	**2.72**	**0.00**	**1.58**	**0.05**	**0.82**

Source: Atmospheric Dynamics, Inc. 4/19.

Operational emissions of the pilot plant would generate approximately 5.76 pounds of CO per day, 2.72 pounds of NOx per day, 1.58 pounds of PM_{10} on a daily basis, and trace amounts of $PM_{2.5}$ and ROG/VOC's. These sources, would not be classified as significant emission sources, and are not expected to generate an air quality impact. Therefore impacts associated with cumulatively considerable net increase of any criteria pollutant for which the region is non- attainment under an applicable federal or state ambient air quality standard would be less than significant with implementation of Mitigation Measure Air-1 Minimize Dust Generation to PM_{10} and $PM_{2.5}$ levels from concentrations that could be cumulatively considerable in the local area.

MITIGATION MEASURE:

Air-1 Minimize Dust Generation

Wet dust suppression techniques, such as watering and/or applying chemical stabilizers, will be used during construction and operational material handling phases to suppress the fine dust particulates from leaving the ground surface and material stockpiles and becoming airborne through the action of mechanical disturbance or wind motion. During construction and full operations of the proposed project, surface wetting of the project site shall occur every 2-3 hours for a total of three times a day.

c) Expose sensitive receptors to substantial pollutant concentrations?

Less Than Significant Impact. As discussed in "b" above, the project would not increase criteria pollutants to a significant level. The aggregate emission levels produced by the proposed project site are shown in Tables 6a and 6b. Based upon the findings, no construction or operational air quality impacts are anticipated from project.

Figure 2 displays the distance to the nearest receptors that are approximately 2,500 feet from the project site. Therefore, the project would have a less than significant impact related to exposure of sensitive receptors to substantial pollutant concentrations because of the distance to sensitive receptors and the lower than threshold concentrations that would be produced by the project.

TABLE 6a: Aggregate Emissions –Project Construction

	Aggregate Emissions for Criteria Pollutants					
SCENARIO EXAMINED	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Construction Vehicle Emissions (Table 4a)	12.4	27.4	3.6	0.8	0.7	4.0
Surface Grading Dust Generation	- -	- -	- -	0.3	0.1	- -
Powered Haulage Emission Generation for Construction Setup (Table 4b)	0.3	4.0	0.0	4.7	1.1	0.1
Total	**12.7**	**31.4**	**3.6**	**5.8**	**1.9**	**4.1**
BAAQMD Significance Threshold:	**n/a**	**54**	**- -**	**82**	**54**	**54**

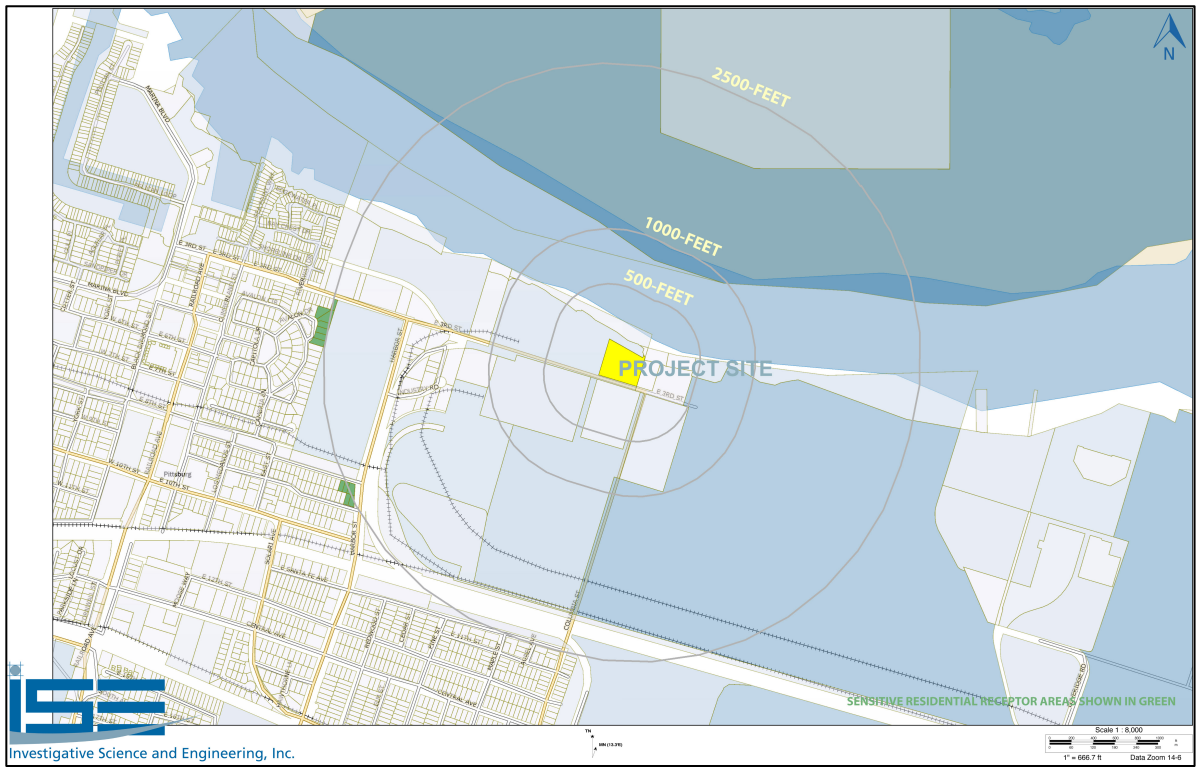
Values rounded to nearest tenth of a pound.

TABLE 6b: Aggregate Emissions –Project Operations

	Aggregate Emissions for Criteria Pollutants					
SCENARIO EXAMINED	**CO^2**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Vehicular Traffic Generation (Table 8b in Appendix A)	2.5	0.6	0.0	0.0	0.0	0.1
Diesel Vehicle Emissions (Table 4a)	12.4	27.4	3.6	0.8	0.7	4.0
Powered Haulage Emission Generation for Material Handling (Table 4b)	0.3	4.0	0.0	4.7	1.1	0.1
Worst-Case Operational Emissions (Table 5)	5.8	2.7	0.0	1.6	0.1	0.8
Total (Σ)	**21.0**	**34.7**	**3.6**	**7.1**	**1.9**	**5.0**
BAAQMD Significance Threshold:	**- -**	**54**	**- -**	**82**	**54**	**54**

[2] It was previously shown in Table 6 that the project was found to be in compliance with both the BAAQMD 8-hour and 1-hour CO thresholds with a maximum value of 0.03 ppm. Thus, no impacts are expected.

Figure 2: Closest Receptors to the Project Site*



**Green color denotes nearest receptors.*

d) Result in other emissions (such as those leading odors) adversely affecting a substantial number of people?

Less Than Significant Impact. The inhalation of VOC's causes smell sensations in humans. These odors can affect human health in four primary ways:

- The VOC's can produce toxicological effects;
- The odorant compounds can cause irritations in the eye, nose, and throat;
- The VOC's stimulate sensory nerves that can cause potentially harmful health effects; and,
- The exposure to perceived unpleasant odors can stimulate negative cognitive and emotional responses based on previous experiences with such odors.

The proposed project operations could generate trace amounts (less than 1 $\mu g/m^3$) of substances such as ammonia, carbon dioxide, hydrogen sulfide, methane, diesel, dust, organic dust, and endotoxins (i.e., bacteria are present in the dust). Odor during construction would be the same as with operations less the chemicals used during operations. Odor generation impacts due to the project would not be significant, since any odor generation would be intermittent, short term and low concentrations from the closed process. As shown on Figure 2, the distance to the nearest receptors that are approximately 2,500 feet from the project site which reduces the probability that nearby residences would complain about odors in the vicinity due to distance and low concentrations. The proposed project would not result in a substantial increase in odors outside of the facility that would affect a substantial number of people. Therefore, potential impacts related to objectionable odors would be less than significant.

1.4 BIOLOGICAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?	☐	☐	☒	☐
c) Have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☒	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☒	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

Discussion

A Biological Resource Assessment was completed for the proposed project in May 2019. The Assessment included a reconnaissance-level survey that was performed by biologist Chris Rogers on April 25, 2019. The Assessment, located in Appendix B, provides species descriptions, background and site-specific information pertaining to special-status plants, wildlife species and habitats, which may represent constraints to the proposed project. The following is a summary of listed species with potential habitat in the vicinity of the project area. A detailed list of all sensitive species that have been included in database queries of the nine 7.5-minute USGS quadrangles surrounding the study area are included in Appendix B along with their potential to occur in the project area. The impact evaluation also includes a summary of the Assessment results used to determine the potential for biological resource impacts.

The presence or potential for occurrence of special-status biological resources within the biological study area (BSA) is based on direct observation or an evaluation of the suitability of existing habitats occurring within the BSA. Suitability is based on familiarity with the specific habitat requirements (i.e., elevation, geology, soil chemistry and type, vegetation communities, microhabitats), geographic distribution, local occurrence records, and the degree of habitat disturbance or alteration.

The BSA is located at 895 E. Third Street. The property is bordered by existing industrial facilities and open fallow fields. A small portion of the site is situated on the shoreline of New York Slough just upstream (east) of the confluence with the Sacramento River, opposite of Browns Island, and 1.0 km (0.6 mi) east of the Pittsburg Marina.

The proposed project site is a paved and gravel lot with several existing buildings. Vegetation is dominated by non-native ruderal (i.e. weedy) plants and landscaping trees. A small easement extends to the shoreline of New York Slough, which supports sparse emergent wetland vegetation in intermittent patches, and armored sections with little or no vegetation. No submerged aquatic vegetation is present along the shoreline. The plant communities and wildlife habitats present in the study area are described below.

No native soils or land surfaces remain on the site. Underlying geology of the paved project vicinity consists of clay soils derived from alluvial deposits, which supported agriculture in the past. These soils are older and more stable than the peat and muck that more recently accreted to form the delta islands to the north of the New York Slough, and throughout the delta. Soils onsite are mapped as belonging to the Clear Lake series (USDA, 2018). The Clear Lake series consists of poorly drained soils that, in an undisturbed condition, support annual grasses and forbs and scattered live oaks. These soils are generally deep, with groundwater at about 2 m (80 in). Clear Lake soils are classified as Xeric Endoaquerts.

The New York Slough reach of the San Joaquin River constitutes a prominent hydrologic feature of the project area. At the project site, the river is tidally influenced, with tidal fluctuations of an average of 1.6 m (5.2 ft).

The majority of the BSA is developed, including concrete pavement and industrial buildings, and a concrete-covered stormwater outfall and discharge pipe that extends into the waters of New York Slough (Figure 3). The above-ground structures are maintained and in use, diminishing their suitability for nesting or roosting wildlife. Nonetheless, certain birds and bats could reside within or on these structures at various times of year. Ornamental landscaping trees also are included within this cover type.

Plant communities and habitats occurring within the BSA include anthropogenic, aquatic, littoral zone, river bank, and ruderal uplands. Although developed and highly altered by agriculture which predated the current industrial use, the shoreline and aquatic habitat within the BSA is considered to have relatively high wildlife habitat values.

Figure 3: Vegetation and Habitat Types

Would the proposed project:

a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

Less Than Significant with Mitigation. The following is a summary of species with potential to be impacted by the project due to the presence of designated or suitable habitat followed by the evaluation of project activities on the species.

Special-Status Wildlife Species

Chinook Salmon (Central Valley Spring-Run and Winter-Run ESUs)

The Chinook salmon (*Oncorhynchus tshawytscha*) Central Valley Spring-Run Evolutionarily Significant Unit (ESU) was listed as Threatened under FESA in 2005[3]; a five-year review of this ESU was completed in 2016 (NMFS, 2016). The Sacramento River Winter-Run Evolutionarily Significant Unit (ESU) of Chinook salmon (*Oncorhynchus tshawytscha*) was listed as Threatened under FESA in 1994[4] and its status was confirmed in 2014[5]; a five-year review of this ESU was completed in 2011 (NMFS, 2011).

Critical habitat has been designated for the Central Valley Spring-Run ESU of Chinook by the NMFS. The project site is located in the North Diablo Range Hydrologic Unit 5543 of designated critical habitat.

Critical habitat has been designated for the Sacramento River winter-run Chinook ESU by the NMFS. The project site is not located in designated critical habitat for this ESU.

The 6-inch thermal cooling water outfall to be utilized by the project is located within suitable habitat for the Central Valley Spring-Run ESU of Chinook and the Sacramento River winter-run of Chinook. No occurrences for the Central Valley Spring-Run ESU or Sacramento River winter-run of Chinook have been recorded from within an 8 km (5 mi) radius of the project site (CNDDB, 2019). Nonetheless, due to the presence of suitable aquatic habitat within the BSA and given that the project site is located within designated critical habitat, the presence of Chinook must be assumed.

Delta Smelt

The Delta smelt (*Hypomesus transpacificus*) is federally Threatened (San Francisco Bay/Delta DPS[6]); and State Endangered. The proposed project is located on the shores of New York Slough, which is included in the Critical Habitat designation.

The 6-inch thermal cooling water outfall is located within suitable migratory habitat for Delta smelt, and the species is presumed to be present. However, the shoreline at the project location does not provide suitable breeding or rearing habitat for the species.

[3] 70 FR 37160

[4] 59 FR 440

[5] 79 FR 20802

[6] Distinct Population Segment

Longfin Smelt

Longfin smelt (*Spirinchus thaleichthys)* is federally listed as a Candidate species (San Francisco Bay/Delta DPS[7]) and is State listed as Threatened. Critical Habitat has not been designated for the longfin smelt. No suitable spawning habitat for longfin smelt is present within the study area. However, migrating and foraging longfin smelt may occur in the project vicinity.

North American Green Sturgeon

The Southern Distinct Population Segment (DPS[8]) of the North American green sturgeon (*Acipenser medirostris*) was federally listed as Threatened in 2006.[9] Critical habitat for the species was designated by the NMFS in 2009.[10] It is also listed as a California Species of Special Concern. The project site is located within designated critical habitat. Nonetheless, due to the presence of suitable aquatic habitat and given that the 6-inch thermal cooling water outfall is located within designated critical habitat, the presence of sturgeon must be assumed.

Sacramento Splittail

Sacramento splittail (*Pogonichthys macrolepidotus*) is Species of Special Concern in California. Although it was determined that the species did not warrant federal listing by the USFWS in 2010, it remains a candidate for listing under Federal Endangered Species Act (FESA).[11] Critical Habitat has not been designated for the Sacramento splittail. The species is considered to potentially occur on site. Sacramento splittail has not been recorded from within an 8 km (5 mi) radius of the project site (CNDDB 2019). The 6-inch thermal cooling water outfall is located within suitable habitat, therefore, the presence of longfin smelt must be assumed. No suitable spawning habitat for longfin smelt is present within the study area. However, migrating and foraging longfin smelt may occur in the project vicinity.

Steelhead

The Central Valley Distinct Population Segment (DPS[12]) of steelhead (*Oncorhyncus mykiss*) was listed as threatened under FESA in 2006[13]; a five-year review of this DPS was completed in 2016 (NMFS, 2016). It is a considered a Special Animal in California. The project site is not located within designated Critical Habitat for the species. The Central Valley steelhead DPS is not a covered species under the HCP/NCCP (Jones & Stokes, 2006). The project site is located within suitable habitat for the Central Valley DPS of steelhead. One occurrence for the Central Valley DPS of steelhead is recorded from within an 8 km (5 mi)

[7] Distinct Population Segment

[8] NMFS has relied on the Evolutionarily Significant Unit (ESU) concept and considers DPSs to represent ESUs if the population is reproductively isolated and represents an important component in the evolutionary legacy of the species.

[9] 71 FR 17757

[10] 74 FR 52300

[11] 77 FR 19756

[12] NMFS has relied on the Evolutionarily Significant Unit (ESU) concept and considers DPSs to represent ESUs if the population is reproductively isolated and represents an important component in the evolutionary legacy of the species.

[13] 71 FR 834

radius of the project site (CNDDB 2019). This record (Occ. #27) is a 2012 sighting from the Bouldin Island quadrangle.

Pacific Pond Turtle

The Pacific pond turtle (*Emys marmorata*, hereafter referred to as PPT[14]), is the only fresh-water turtle native to greater California. The PPT is a Species of Special Concern in California. Critical Habitat has not been designated for the PPT.

The waters of New York Slough and its banks provide both suitable breeding habitat and a movement corridor for PPT. While the section in which the project is located provides perennial water, it lacks vegetative cover and warm, sandy banks for breeding. However, the project site is not mapped as providing either core or movement habitat for PPT (Jones & Stokes, 2006). No PPTs were observed during the present survey.

There are four records of the species occurring within 4.8 km (3 mi) of the project site. This nearest record (Occ. #144) consists of two adults observed in 1998 in a pond on the Dow Chemical facility on the south shoreline of New York Slough approximately 1.5 km (0.9 mi) east of the project site.

Special-Status Plant Species

Mason's Lilaeopsis

Mason's lilaeopsis *(Lilaeopsis masonii)* is state listed as rare. Critical habitat has not been designated for Mason's lilaeopsis. A small patch of Mason's lilaeopsis occurs within the study area, on fine sediments accumulated in riprap at the mouth of the stormwater outfall (see Figure 5, and photographs 4 and 5 in Attachment A of Appendix B). The total area is approximately 3 ft^2. Marginally suitable habitat for Mason's lilaeopsis is present within the littoral zone of the study area but was not otherwise present. There are 12 records of Mason's lilaeopsis within an 8 km (5 mi) radius of the project site (CNDDB, 2019); it has been recorded from the Browns Island due north of the project site, in relatively undisturbed habitat on the unarmored shoreline.

Impacts

The project site is located within designated EFH for the Pacific Groundfish Fishery. Operation of the thermal cooling water discharge would be within permitted parameters for temperature provided by the San Francisco RWQCB within their authorization to use the outfall. The project's cooling water discharge would not result in adverse effects on EFH because the maximum temperature of 86° F allowed in the previous permit for the outfall would not be exceeded.

Project implementation would not impede the movement of any fish species. Construction and operation of the proposed project would not result in take of the species, or significant adverse effects. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal cooling water through the existing 6-inch outfall will be consistent with previously permitted use and would not result in changes to aquatic habitat. However, the project site is located within designated critical habitat for Delta smelt and spring-run Chinook; therefore, impact avoidance and minimization measures are warranted. Suitable or marginally suitable habitat is present on site for a total of eight special-status animal species. These include six fish species (Chinook salmon, Delta smelt, longfin smelt, green sturgeon, Sacramento splittail, and steelhead). Also potentially occurring within the BSA are Pacific pond turtle, bank swallow.

[14] Formerly classified as *Clemmy marmorata* and *Actinemys marmorata*; also known as western pond turtle.

No activities associated with construction or operation of the proposed project are expected to have any adverse effect on these species.

However, because of the sensitivity of the aquatic species and their habitat are in close proximity to the project activities, the importance of contact avoidance and prevention of upsets necessitates protections that are included in Mitigation Measure Bio-1 Protection of Special-Status Fish Species.

Although no individuals of Pacific pond turtle were observed during the recent survey, the species is known to inhabit stream mouths and the shoreline of the San Joaquin River in Contra Costa County. The river bank at the project could attract pond turtles since marginally suitable locations for sunning are present on site. Warm, sandy banks required for egg-laying are not present on site. Nonetheless, Pacific pond turtles could move through the work area along the shoreline between occupied habitats. If present, individuals could be harmed during construction activities. With the incorporation of the Mitigation Measure Bio-2, potential impacts to Pacific pond turtle would be reduced to a less-than-significant.

One special-status species, Mason's Lilaeopsis, was detected within the BSA. Although not detected, suitable or marginally suitable habitat is present on the shoreline for several other special status species, such as Suisun marsh aster. Accidental impacts could result during movement or placement of equipment or people near stormwater outfall. If construction activities are required near the shoreline of the project area, implementation of Mitigation Measure Bio-3 would reduce potential impacts to special status plant species to less than significant.

MITIGATION MEASURES:

Bio-1 Protection of Special-Status Fish Species

1. The identification and protection of special-status species populations and habitats shall be a part of a worker environmental awareness program (WEAP) for all workers onsite. Documentation of participation shall be kept onsite for review by City and/or resource agencies.
2. No work shall occur within the waters of New York Slough.
3. All discharges through the stormwater outfall shall be the same as with current and past use of the site, i.e. conveyance and discharge of runoff from the project site only, through existing catchments and culverts.
4. No alteration or reconfiguration of the shoreline at the stormwater outfall shall occur. The existing rock slope protection and soil on the shoreline shall be left in place.
5. No change to the location or operation of the 6-inch thermal wastewater outfall shall occur. The discharge shall be operated according to previously permitted operation parameters with regard to volume and of the discharge and allowable temperature changes within the aquatic environment, to be outlined in an NPDES permit specific to the proposed project.
6. To ensure toxic substances are not released into the aquatic environment, the following measures shall be followed:

   a. all engine-powered equipment shall be well-maintained and free of leaks of fuel, oil, hydraulic fluid or any other potential contaminant;

   b. all engine-powered equipment used and operated from the decks of barges, boats or the wharf shall be positioned over drip-pans;

   c. a spill prevention and response plan shall be prepared in advance of the commencement of work; a spill kit with appropriate clean-up supplies shall be kept on hand during the construction and operations phases of the project;

d. refueling and maintenance of mobile equipment shall not be performed directly over the waters of the river. Only approved and certified fuel cans with "no-spill" spring-loaded nozzles shall be used.

7. Any wildlife encountered during work shall be allowed to leave the construction area unharmed and shall not be flushed, hazed, or herded away from the project site.
8. Any special-status species detected shall be reported to the CDFW and a survey form shall be submitted to the CNDDB.

Bio-2 Protection of Pacific Pond Turtle

1. Boats, barges and project-related floating or submerged equipment shall be prevented from contacting the shoreline to avoid crushing individuals that may move through the work area.
2. If pond turtles are observed, they shall be permitted to move out of the work area on their own. If pond turtles are stationary and remain in areas where they would be disturbed by activities, they may be relocated. Only a qualified biologist with a valid scientific collecting permit and prior authorization from the CDFW may relocate Pacific pond turtles.
3. The project biologist shall report sightings, relocations or mortalities of Pacific pond turtle to the CDFW.

Bio-3 Protection of Special Status Plants

1. The location of special-status plants and suitable habitat shall be designated as environmentally sensitive areas and clearly marked in the field with high visibility construction fencing or staking prior to construction and operations.
2. The identification and protection of special-status plant populations and habitats shall be a part of a worker environmental awareness program (WEAP). Documentation of participation shall be kept onsite for review by City and/or resource agencies.
3. Alteration of the riprap at the stormwater outfall shall be avoided. Boats, barges and any floating or submerged equipment shall be prevented from contacting the shoreline to avoid crushing native vegetation.
4. An Project Biologist with 3 years of professional biological experience in the San Francisco Bay Delta region (resume onsite for City and/or resource agency review) shall inspect the shoreline for proper maintenance of the construction fencing or staking and identify activities that may pose a risk of impacting special-status plant populations and habitats annually.
5. The project biologist shall report rare plant observations to the CNDDB. Accidental impacts to rare plant populations shall be reported to the CDFW. Discovery of any additional special status plants species will be reported to the CDFW, and a suitable response agreed upon before restating work in that area.
6. If changes to the condition of the shoreline are determined to be necessary, then the project proponent will prepare a Mitigation and Monitoring Plan (MMP) subject to approval by regulatory agencies including launching boats from shoreline or working on the storm drain or cooling water discharge pipe.

b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?

Less Than Significant Impact. Special-status natural communities recorded from the project region include Alkali Meadow, Alkali Seep, Cismontane Alkali Marsh, Coastal and Valley Freshwater Marsh, Coastal Brackish Marsh, Northern Claypan Vernal Pool, Serpentine Bunchgrass Grassland, Stabilized Interior Dunes, and Valley Needlegrass Grassland (CNDDB, 2019). None of these special-status natural communities are present within the project footprint and none would be impacted by the proposed project.

Based on a review of CNDDB (2019), the project site is located within designated critical habitat for Delta smelt and spring-run Chinook (see discussion in "a" above). However, because the proposed project does not include work within the aquatic environment, and discharges through the outfall would be within permitted parameters (See Section 1.10 for details), there would be a less than significant impact on critical habitat.

c) Have a substantial adverse effect on federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?

Less Than Significant Impact. Small, fringing patches of freshwater emergent marsh are present along the shoreline near the study area. This vegetation occurs in a narrow band, averaging 0.6 – 1.8 m (2 – 6 ft) in width. It does not conform to the described special-status natural communities but does constitute jurisdictional wetlands.

Project implementation would not result in potentially significant impacts to features falling under the jurisdiction of the USACE, CDFW and RWQCB. No discharge of fill material into waters of the U.S. or of the state would occur, nor would there be alteration of the bed or bank of New York Slough, and no loss or impact to jurisdictional wetlands or riparian habitat, or loss of beneficial uses associated with them. Therefore, no action would occur that would be subject to federal, state and local laws and policies that regulate wetlands and other waters[15] because the areas of potential jurisdictional wetlands is between the stormwater outfall and the water and all project activities avoid this area. Therefore, the project would have a less than significant impact on federally protected wetlands.

d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

Less Than Significant with Mitigation. The BSA supports suitable nesting habitat for a variety of special-status and migratory passerines (perching birds), mainly consisting of the row of eucalyptus trees on the eastern portion of the site. A few other small trees and ornamental shrubs provide some nesting opportunities, as well. No bird nests were observed on site during the April 25, 2019 survey discussed in Appendix B.

Although the removal or pruning of trees or other vegetation on the river banks is not proposed, project implementation would temporarily increase noise and human activity levels nearby. If occurring between February 1 and August 31, these activities could result in indirect impacts on birds by disrupting breeding

[15] Except with regard to NPDES; see Section 1.10 Hydrology.

or causing abandonment of occupied nests. If present at the time of construction, such indirect impacts on special-status and migratory birds would be considered Take.

As discussed in "a" above, Project implementation would not impede the movement of fish species. However, the aquatic habitat of New York Slough and the shoreline of the subject property may be part of wildlife movement corridors. Although over-land movement is restricted by fencing, barren ground, and moderately intense human disturbance in the form of vehicles, pedestrians, lighting and noise, the shoreline is somewhat protected from these limitations. Vegetation on the river bank provides cover for dispersing wildlife, forming a corridor between more extensive areas of undeveloped, natural habitats. Open water also facilitates the movement of numerous aquatic species such as mountain beaver, common muskrat and northern river otter. The San Joaquin River serves as an important corridor for resident and anadromous fish.

Nonetheless, project implementation would not interfere substantially with the local or regional movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors or impede the use of native wildlife nursery sites because the deepwater discharge of thermal cooling water would be the only project component within wildlife areas. The volume and temperature of the water being discharged would be within the criteria for the discharge of elevated temperature water in the State Water Resources Control Board's *Water Quality Control Plan for Control of Temperature in The Coastal and Interstate Waters and Enclosed Bays And Estuaries Of California.* A detailed discussion of cooling water discharge is located in Section 1.10 Hydrology and Water Quality. As discussed in "a" because of the sensitivity of the aquatic species and their habitat, considerations by staff onsite of contact avoidance and prevention of upsets measures are is presented in Mitigation Measure Bio-1 Protection of Special-Status Fish Species and Bio-2 Protection of Pacific Pond Turtle. Implementation of Mitigation Measures Bio-1 and 2 would reduce potential impacts to aquatic wildlife movement to less than significant.

If present at the time of construction, direct or indirect impacts on breeding migratory birds could result. To ensure compliance to the Migratory Bird Treaty Act (MBTA) and the California Fish and Game Code (CFGC) related to protections for migratory birds and raptors, the actions outlined in Mitigation Measure Bio-4 should be performed prior to the commencement of construction activities. With the incorporation of the measures outlined below, potential impacts would be reduced to a less-than-significant level.

MITIGATION MEASURE:

Bio-4 Protection of Special Status and Migratory Birds

1. If construction activities are scheduled to occur outside of the breeding season (i.e., September 1 through January 31), no preconstruction surveys or other mitigation measures are necessary.
2. If construction activities are scheduled to occur during the breeding season (i.e., February 1 through August 31), a preconstruction nesting bird survey shall be conducted of the identified work area and a buffer zone (see #3, below). The survey shall be performed by a qualified biologist no more than two weeks prior to the initiation of work. If no nesting or breeding activity is observed, work may proceed without restrictions. To the extent allowed by access, all active nests identified within 76 m (250 ft) for raptors and 33 m (100 ft) for passerines should be mapped.
3. For active nests found near the construction limits (76 m [250 ft] for raptors and 33 m [100 ft] for passerines), the project biologist shall make a determination as to whether or not construction activities are likely to disrupt reproductive behavior. If it is determined that construction is unlikely to disrupt breeding behavior, construction may proceed. If it is

determined that construction may disrupt breeding, the no-construction buffer zone should be expanded. The ultimate size of the no-construction buffer zone may be adjusted by the project biologist based on the species involved, topography, lines of sight between the work area and the nest, physical barriers, and the ambient level of human activity. For raptors, the project biologist should contact CDFW and/or the USFWS Division of Migratory Bird Management for guidance regarding site evaluations and buffer adjustments.

4. If it is determined that construction activities are likely to disrupt raptor breeding, construction activities within the no-construction buffer zone may not proceed until the project biologist determines that the nest is long longer occupied.

5. If maintenance of a no-construction buffer zone is not practicable, active nests should be monitored by a qualified biologist to document breeding and rearing behavior of the adult birds. If it is determined that construction activities might cause nest abandonment, work should cease until the project biologist determines that the nest is no longer occupied. For raptors, the CDFW and/or the USFWS Division of Migratory Bird Management should be contacted by the project biologist for guidance.

e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

No Impacts. There would not be removal of trees or habitat on site as part of project construction or implementation. All elements of the proposed project construction and operation would be in conformance with all existing and applicable local, regional, State, and federal plans, policies, and guidelines regarding the protection and conservation of sensitive species and habitats, including but not limited to plans, policies and guidelines of the Pittsburg Municipal Code (PMC), Pittsburg General Plan, the East Contra Costa Habitat Conservation Plan (ECCHCP), the California Department of Fish and Game, and the U.S. Fish and Wildlife Service. No impact would occur resulting from conflict related to violation of local biological regulations or policies.

f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?

No Impacts. The East Contra Costa County Habitat Conservancy is a joint exercise of powers authority formed by the Cities of Brentwood, Clayton, Oakley and Pittsburg and Contra Costa County to implement the East Contra Costa County Habitat Conservation Plan/Natural Community Conservation Plan (ECCCHCP/NCCP). The ECCCHCP/NCCP provides a framework to protect natural resources in eastern Contra Costa County, while improving and streamlining the environmental permitting process for impacts on endangered species. The ECCCHCP/NCCP allows Contra Costa County, the Contra Costa County Flood Control and Water Conservation District, the East Bay Regional Park District, the Cities of Brentwood, Clayton, Oakley, and Pittsburg, (the joint exercise powers authority formed East Contra Costa County Habitat Conservancy) o control endangered species permitting for activities and projects in the region that they perform or approve. (ECCCHC 2006) Impacts related to species and habitats in the area are measured in terms of compliance with the ECCCHCP/NCCP.

The area where the proposed project is located is under the regulatory jurisdiction of the ECCCHCP/NCCP, which determines adherence to State, regional, and national regulatory policies. The proposed project is identified as “urban land cover” by the HCP that allows construction, maintenance and use industrial facilities. Further development of the project site would not result in the take of sensitive species or sensitive habitat lands. Therefore, no impact would occur regarding inconsistency of the proposed project with policies in a drafted or adopted conservation plan.

1.5 CULTURAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

Discussion

Would the proposed project:

a) Cause a substantial adverse change in the significance of a historical resource pursuant in §15064.5?

No Impacts. As discussed in the project description, the project site was previously host to a 20-megawatt cogeneration power plant, owned and operated by GWF Power Systems Company, Inc. (GWF) which commenced operations in August 1990[16] and was decommissioned in 2012. As shown on Figure 2, two buildings remain in place that are not significant historical resources. Since there are no historical resources within the project study area, for the purposes of CEQA, that would cause a substantial adverse change in the significance of a historical resource as defined in Section 15064.5, implementation of the proposed project would result in no impact on historic resources.

b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

c) Disturb any human remains, including those interred outside of formal cemeteries?

b. – c. ***No Impacts*** Site remedial actions, prior to the construction of the GWF plant, resulted in contaminated soil excavation, consolidation and capping under building floors, and asphalt pavements. The proposed project would consist of skid mounted equipment with no below grade construction of facilities or pipelines. Therefore, there would be no impacts associated inadvertant discoveries of archaeological resources or human remains during construction or operations of the proposed project.

[16] Heritage Global Partners https://www.hgpauction.com/auctions/6857/online-auction-gwf-power-systems-l-p-3/

1.6 ENERGY

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful inefficient, or unnecessary consumption of energy resources, during project construction or operation	☐	☐	☒	☐
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?	☐	☐	☐	☒

Discussion

The proposed project would be powered with 100% renewable electricity available from the grid through the City of Pittsburg's participation in Contra Costa County's CCE program provided by MCE Contra Costa.

Senate Bill 100 (De León) was filed with the Secretary of State on September 10, 2018. The goal of the legislation is to achieve 50% renewable resources target of total retail sales of electricity by December 31, 2026, and to achieve a 60% target by December 31, 2030. The policy of the state as described in the bill is that eligible renewable energy resources and zero-carbon resources supply 100% of retail sales of electricity to California end-use customers and 100% of electricity procured to serve all state agencies by December 31, 2045.

The Bay Area Air Quality Management District (BAAQMD) adopted the Bay Area 2017 Clean Air Plan in April 2017 (2017 Plan). The 2017 Plan provides a pathway for the long-term strategies to reduce Bay Area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. This reduction includes significantly eliminating the use of fossil fuels used in transportation and buildings. The Plan offers a long-range vision of how the Bay Area could operate in a year 2050 post-carbon economy.

Would the proposed project:

a) Result in potentially significant environmental impact due to wasteful inefficient, or unnecessary consumption of energy resources, during project construction or operation

Less Than Significant Impact. The goal of the project is to take waste products (flue gas and recycled/crushed concrete aggregate (RCA)) to produce carbon sequestered building materials. The developed products would reduce the need to mine raw materials to produce concrete products overall reducing energy consumption in construction. As a proof of concept, the proposed project would be monitoring and replacing equipment to maximize energy efficiency. During operations, the Applicant has planned to minimize empty truck trips to 15% resulting in efficient use of vehicle miles traveled. Although some energy is used to produce the products, it would be renewable energy and would not create a significant impact due to wasteful inefficient or unnecessary consumption of energy resources to construction or operations.

b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

No Impacts. The proposed project energy plan is to use of 100 percent carbon free energy, available from the grid through the City of Pittsburg's participation in Contra Costa County's CCE program provided by

MCE Contra Costa, to power the proposed Project. Therefore, there would be no impact associated with conflicts to state and local plans for renewable energy plans.

1.7 GEOLOGY AND SOILS

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

Discussion

Table 7 provides a summary of existing faults within the area of the proposed project.

Table 7: Faults in the Vicinity of Pittsburg

Fault	Location and Direction from Project Area	Recency of Movement	Fault Classification	Historical Seismicity	Maximum Credible Earthquake[17]
Hayward	20 miles west	Historic (1868 rupture)	Active	6.8, 1868; Many <4.5	7.5
Concord-Green Valley	6 miles west	Historic (1955 rupture)	Active	Historic active creep	6.5
Clayton-Greenville	3 miles south	Holocene	Active	None known	6.3
Marsh Creek-Greenville	10 miles south east	Historic (1980 rupture) Holocene	Active	5.6, 1980	6.9
Franklin Fault	10 miles west	Late Pleistocene	Potentially Active	None documented	6.8
Antioch	4 miles east	Quaternary	Potentially active	Reported creep	6.5
San Andreas	40 miles west	Historic (1906; 1989 ruptures)	Active	7.1, 1989. 8.25, 1906. 7.0, 1838. Many <6	8.0
Calaveras (Northern)	15 miles south	Historic (1861 rupture) Holocene	Active	5.6–6.4, 1861. 4–4.5 swarms 1970, 1990	7.5

Source: City of Pittsburg 2001. Pittsburg General Plan Health and Safety Element. Page 10-6.

Would the proposed project:

a) Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:

i.) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault?

[17] The Maximum Credible Earthquake (MCE) is the strongest earthquake that is likely to be generated along a fault zone, based on the geologic character of the fault and earthquake history.

Less than Significant Impact. The nearest, designated, Alquist-Priolo earthquake fault zone is located approximately 10 miles to the west of the City. As shown in Table 7 the closest fault not designated by Alquist-Priolo, Clayton-Greenville, is approximately 3 miles south from the proposed project site. There are no known faults that traverse the proposed project site. As a result, the potential to expose people or structures to adverse impacts associated with surface fault rupture is less than significant.

ii.) Strong seismic ground shaking?

Less than Significant Impact. As described in (a)(i) above, the nearest designated, Alquist-Priolo earthquake fault zone is located approximately 10 miles to the west of the City. The closest fault not designated by Alquist-Priolo, Clayton-Greenville, is approximately 3 miles south from the proposed project site. The possibility exists for ground shaking from an earthquake on any of these faults in Table 7. However, the proposed project does not involve development of any permanent structures. The impact from strong shaking would be less than significant.

iii.) Seismic-related ground failure, including liquefaction?

Less than Significant Impact. Based on geotechnical studies completed nearby at the K2 Pure Facility, the fill used to raise site grades on the lower areas has the potential for liquefaction. The proposed project site is likely underlain by alluvial deposits, which contain a thin layer of liquefiable sand at relatively shallow depths (Hultgren-Tillis 2016). Liquefaction within the alluvial areas could result in the surface settlements of less than one inch. However, as stated above in response (a)(ii), the Project does not involve development of any permanent structures, so this impact would be less than significant.

iv.) Landslides?

No Impacts. The proposed project site is on relatively flat land without significant slope and the City of Pittsburg General Plan does not include the proposed project site within a potential landslide hazard area. Therefore, the potential for landslides from a seismic event does not exist. As a result, there would be no impact associated with landslides.

b) Result in substantial soil erosion or the loss of topsoil?

No Impacts. The proposed project includes minor ground disturbance on land that has been capped with cement and asphalt; therefore, no impacts would occur to topsoil or result in soil erosion because there is no topsoil present in the area of construction and operations.

c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

Less Than Significant Impact. As discussed above in "ii" nearby geotechnical investigations indicate the site could contain fill used to raise site grades on the lower areas. This fill has the potential for liquefaction. In addition, the proposed project site is likely underlain by alluvial deposits, which contain a thin layer of liquefiable sand at relatively shallow depths (Hultgren-Tillis 2016). Liquefaction within the alluvial areas could result in the surface settlements of less than one inch. However, no permanent structures are being constructed that could result in potential in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse. Therefore, the impact would be less than significant.

d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?

No Impacts. The Project does not include construction of any permanent buildings, so there would be no impact from expansive soil.

e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

No Impacts. Restrooms would be portable facilities that would have waste pumped and removed from the site. Wastewater from washing and rinsing of product material would be less than 30 gpm and would be collected and sent to the City sewer system in accordance with the City of Pittsburg's Clean Water Program. Thermal wastewater would be discharged through the 6-inch outfall pipe into New York Slough. Therefore, there would be no impacts related to soils incapable of supporting septic tanks or wastewater disposal.

f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

No Impacts. There would be no ground disturbance associated with the proposed project therefore no direct or indirect impact to paleontological resource or unique geologic features would occur.

1.8 GREENHOUSE GAS EMISSIONS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Discussion

A Greenhouse Gas Emissions Assessment was completed for the proposed project in May 2019. The Assessment, located in Appendix C, provides applicable regulations, project setting, assumptions, references used, and detailed methods that were applied to determine project related significance on the greenhouse gas criteria. The following is a summary of state regulations, regional standards and the project proposed operations. The impact assessment also includes a summary of the Assessment modeling results and calculations used to determine emissions.

The Intergovernmental Panel on Climate Change (IPCC) defines greenhouse gases as those naturally occurring and anthropogenic chemical compounds within the atmosphere that absorb and reflect infrared radiation emitted by the Earth's surface. A numerical metric known as the 'Global Warming Potential' (or GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming relative to an 'equivalent' amount of carbon dioxide (CO_2). Equivalent CO_2 is denoted as CO_{2e}.

The Bay Area Air Quality Management District (BAAQMD) has established a set of guidelines for establishing thresholds of significance for greenhouse gasses (GHG's) consistent with CEQA and AB 32 (BAAQMD 2017b). For projects other than stationary sources, a threshold of 1,100 metric tons (MT) of CO_{2e}/yr has been shown to produce a de minimis impact on basin-wide GHG emissions, and thus is in compliance with AB 32.

For the proposed project, which constitutes a stationary source per the applicant's Authority to Construct Application, the BAAQMD establishes a higher aggregate threshold of 10,000 MT of CO_{2e}/yr. This threshold was used to analyze the proposed carbon capture and mineralization process of the pilot plant.

Fixed emission sources would consist predominantly of those emissions identified by the project applicant as being generated as part of the pilot plant operation. The project is expected to utilize one of two different sources of CO_2 for its carbon capture and mineralization process, defined as either Scenario 1 or Scenario 2.

Scenario 1 assumes that the proposed facility would utilize the excess flue gas from a single turbine and heat recovery steam generator (HRSG) at the Calpine LMEC site as the source of CO_2 generation in the pilot process, while Scenario 2 assumes that the project site would utilize a registered 6.3 MBtu/hr natural gas boiler onsite to provide the necessary CO_2 generation. Under these two conditions, Scenario 1 consumes outside CO_2 as part of the process, while Scenario 2 generates the necessary CO_2 onsite. This distinction is only important from the standpoint of determining aggregate greenhouse gas emissions from the site.

Finally, secondary operational greenhouse gas sources would consist entirely of electrical consumption at the project site, solid waste trash generation from the site, and overall site water consumption.

Would the proposed project:

a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?

Less Than Significant Impact. The proposed project site would be constructed and operated over the course of approximately 450 days without any deleterious air quality conformity impacts requiring mitigation, per BAAQMD guidelines. The results are tabulated in Table 8.

N_2O has a GWP of 296 with respect to CO_2, the result can be expressed as an equivalent CO_2 level (CO_{2e}) of 1,257,200.8 pounds, or 570.3 MT. Thus, the final equivalent CO_2 GHG load due to the project would be the summation of this value, and the direct CO_2 production (including any water usage for dust control), also shown in Table 8, or 1,411,577.3 pounds (640.3 MT) CO_{2e}, during all activities.

TABLE 8: Diesel-Powered Construction / Material Handling Vehicle GHG Emissions

			Direct Stoichiometric Gas Emissions	
Equipment Type Model	**Aggregate CO in Pounds (MT)**	**Aggregate NO_X in Pounds (MT)**	**CO_2= 27×CO in Pounds (MT)**	**N_2O = 0.3×NO_X in Pounds (MT)**
CAT 2PD5000 Forklift	748.8 (0.3)	1,396.5 (0.6)	20,218.2 (9.2)	418.9 (0.2)
JD 644E Loader	2,349.2 (1.1)	4,381.1 (2.0)	63,429.6 (28.8)	1,314.3 (0.6)
CAT CT610 Dump Truck	1,031.8 (0.5)	2,738.2 (1.2)	27,857.5 (12.6)	821.4 (0.4)
Peterbuilt 348 Transport Truck	1,444.5 (0.7)	3,833.4 (1.7)	39,000.5 (17.7)	1,150.0 (0.5)
Powered Haulage Emissions (MH DSL)	132.2 (0.1)	1,808.9 (0.8)	3,569.8 (1.6)	542.7 (0.2)
Total (Σ):	**5,706.5 (2.6)**	**14,158.0 (6.4)**	**154,075.6 (69.9)**	**4,247.3 (1.9)**
			CO_{2e} from CO:	**154,075.6 (69.9)**
			CO_{2e} from N_2O:	**1,257,200.8 (570.3)**
			Direct CO_2 from Wet Suppression Water Usage: [18]	**300.9 (0.1)**
			CO_{2e} Total Over Construction Period:	**1,411,577.3 (640.3)**

Rounding margin of error ± 0.1 MT (220.5 pounds)

The proposed project site is expected to have a cumulative worst-case trip generation level of 25 ADT as previously analyzed within the project's Air Quality Impact Assessment (AQIA) (Appendix A). The average vehicle trip length would be 50 miles, with a median running speed of 45 MPH. Given this, the aggregate project trip GHG emission levels are shown in Table 9 below.

TABLE 9: Project Daily Operational Vehicle GHG Levels

[18] Water usage based upon an assumed wet suppression level of 36,000 gallons over the course of construction.

Vehicle Classification	Trip ADT	Total Emissions in Pounds per Day (MT per Day) Direct CO_2	Direct N_2O	CO_{2e}
Light Duty Auto (LDA)	17	475.1 (0.2)	0.0 (0.0)	483.3 (0.2)
Light Duty Truck (LDT1)	5	156.0 (0.1)	0.0 (0.0)	161.6 (0.1)
Medium Duty Truck (LHD1)	2	128.6 (0.1)	0.0 (0.0)	132.7 (0.1)
Heavy Duty Truck Gasoline (MH GAS)	0	50.9 (0.0)	0.0 (0.0)	52.3 (0.0)
Heavy Duty Truck Diesel (MH DSL)	1	93.1 (0.0)	0.1 (0.0)	129.6 (0.1)
Motorcycle (MCY)	0	2.1 (0.0)	0.0 (0.0)	3.2 (0.0)
Total (Σ):	25	905.8 (0.4)	0.2 (0.0)	962.7 (0.4)
			CO_{2e} from CO:	**905.8 (0.4)**
			CO_{2e} from N_2O:	**57.0 (0.0)**
			CO_{2e} Operational Total Per Day:	**962.7 (0.4)**

Rounding margin of error ± 0.1 MT (220.5 pounds)
Values rounded to closest whole integer vehicle

As provided in the Discussion above, fixed CO_2 emission sources under the context of this pilot project would consist of Scenario 1 or Scenario 2.

Only one scenario will be ultimately selected as the CO_2 generation for the carbon capture and mineralization process of the pilot plant, and both scenarios anticipate an approximate 70% recovery rate of CO_2 through the mineralization process that would otherwise be released into the atmosphere. The complete operational emissions summary, as estimated by the project applicant, is shown in Table 10.

TABLE 10: Applicant Predicted Operational Emissions

Scenario Examined	Operational Phase	Generated CO_{2e} (MT)
Scenario 1: Flue Gas Extraction	Offsite Import of CO_2 to Site	-973.1
	Recovered CO_2 Level @ 70% Efficiency	**-681.2**
Scenario 2: Onsite Boiler Utilization	Onsite Generation of CO_2	+793.4
	Recovered CO_2 Level @ 70% Efficiency	+555.4
	Net CO_2 Level Remaining	**+238.0**

Source: Atmospheric Dynamics, Inc. 4/19.

Thus, under Scenario 1, the project would remove 681.2 MT of CO_{2e} as a result of the carbon capture and mineralization process, while Scenario 2 would produce a small overall increase in CO_{2e} of 238.0 MT due to less than perfect system efficiency. These sources, in and of themselves, would not be classified as significant emission sources, and are not expected to generate a GHG impact.

The project site would require an estimated average yearly energy consumption of 775,000 KWh/year. Utilizing an intensity factor consistent for a 20% Renewable Portfolio Standard (RPS), gives an annual equivalent CO_{2e} GHG load for the project site due to electrical usage of 225.6 MT/year.

The project site would have an onsite solid trash waste storage capacity of 10 cubic yards (cu-yd), with an average weight of 200 pounds per cubic-yard. Assuming two trash pickups per week, in accordance with proposed site requirements, the aggregate total solid waste removed from the site would be 208,000 lbs/year (or 104 short tons per year). According to the IPCC, landfill CO_{2e} generation due to trash is approximately 0.3196 pounds per pound of trash per year (IPCC 2001). Thus, the direct landfill CO_{2e} contribution level would be 30.2 MT/yr.

The projected greenhouse gas emission budget for the proposed project would be the summation of the individual sources previously identified and compared against the two aforementioned pilot process scenarios, as shown in Tables 11a and -b.

TABLE 11a: Summary of Significant Project-Related GHG Emissions – Scenario 1

Project Phase / Operation	Total CO_{2e} Emissions in MT/year
Construction / Material Handling / Haulage	+640.3
Operational Vehicular Emissions	+159.4
Electrical Consumption	+225.6
Solid Waste Generation	+30.2
Water Consumption / Wastewater Processing	+0.4
GHG Emissions Due to Project Development	**+1055.9**
Recovered CO_2 Level @ 70% Efficiency (Table 4)	-681.2
Final Project GHG Emissions Under Scenario 1	**+374.7**

Rounding margin of error ± 0.1 MT (220.5 pounds)

TABLE 11b: Summary of Significant Project-Related GHG Emissions – Scenario 2

Project Phase / Operation	Total CO_{2e} Emissions in MT/year
Construction / Material Handling / Haulage	+640.3
Operational Vehicular Emissions	+159.4
Electrical Consumption	+225.6
Solid Waste Generation	+30.2
Water Consumption / Wastewater Processing	+0.4
GHG Emissions Due to Project Development	**+1055.9**
Recovered CO_2 Level @ 70% Efficiency (Table 4)	+238.0
Final Project GHG Emissions Under Scenario 2	**+1293.9**

Rounding margin of error ± 0.1 MT (220.5 pounds)

Both scenarios produce combined construction and operational levels far below the BAAQMD allowable threshold of 10,000 MT CO_{2e} per year. Thus, no construction or operational impacts are expected, so the project's generation of greenhouse gas emissions would cause a less than significant impact on the environment.

b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?

No Impacts. As discussed in Section 1.3 Air Resources "a" above, the Bay Area Air Quality Management District (BAAQMD) adopted the Bay Area 2017 Clean Air Plan in April 2017 (2017 Plan). In addition to reducing emissions of air pollutants and greenhouse gases in the Bay Area over the near term, the 2017 Plan provides a pathway for the long-term strategies to reduce Bay Area GHG emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. The Plan offers a long-range vision describing how the Bay Area could look and function in a year 2050 post-carbon economy, and describes a comprehensive control strategy that the BAAQMD will implement over the next three to five years to protect public health and the climate, while setting the region on a pathway to achieve the 2050 vision. (BAAQMD 2017a)

The project is a proof of concept for the sequestration of carbon, ultimately from flue gas, into building materials using renewable energy and recycled water when feasible. A successful project would result in reduction of mining of raw materials for construction as well as support the BAAQMD 2017 Plan for a post-carbon future. The discussion in "a" above also supports the analysis that the project is in compliance BAAQMD CEQA Thresholds. Therefore, the project does not impact applicable plans, policies or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

1.9 HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wildland fires?	☐	☐	☐	☒

Discussion

The Contra Costa Health Services - Hazardous Materials Programs (CCHSHMP) is responsible for monitoring industries located within Contra Costa County that use or store hazardous materials and responding to hazardous materials incidents that occur within the County. The CCHSHMP established the Hazardous Materials Business Plan (HMBP) program in 1986 to prevent or minimize damage to public health, safety, and the environment from a release or threatened release of hazardous materials. This is accomplished by enforcing the provisions of County's HSC Division 20, Chapter 6.95, requiring businesses that handle hazardous materials in reportable quantities to submit an annual HMBP, as well as prepare a site map, develop an emergency response plan, and implement a training program for employees.

As discussed in Air Resources, Section 1.3, Scenario 1 would remove CO_2 from flue gas and combine it with RCA (demolished and returned concrete. As provided in the project description, Table 12 provides the chemicals used in the process in the operations of the proposed project.

Table 12: Chemicals and Quantities Stored Onsite

Chemical	Common Name, Physical State	Approximate Storage Volume	Location of Chemical Addition
NH_4Cl	Ammonium chloride, solid	One (1) pallet or roughly 2,200 lb; 40 x 50 lb bags	Reformer Module
NH_3	Ammonia, 0.5 to 19 wt% aqueous solution	One (1) tank of less than 260 gal; less than 2,100 lb	CO_2 Capture Module
HCl	Hydrochloric acid, 30% aqueous solution	One (1) tank of less than 260 gal; less than 2,500 lb	CO_2 Capture Module, Carbonate Coating Module
$CaCl_2$	Calcium chloride, solid	One (1) pallet or roughly 2,200 lb; 40 x 50 lb bags	Carbonate Coating Module
n/a	Waste concrete aggregate, solid	Two (2) piles or roughly 25 cubic yards; 17 ft. w x 17 ft. l x 5 ft. h piles	Reformer Module

As provided on the Material Safety Data Sheet (MSDS) ammonia is not very reactive, but the vapor is toxic and a severe irritant of the respiratory system. Hydrochloric acid (30% aqueous solution) is a severe irritant to the respiratory system if spray is inhaled. The solution is very hazardous when in contact with skin, eye or ingested. Skin contact may produce burns. Calcium chloride is stable under normal storage conditions and is not considered a hazardous substance on the MSDS sheet. However safe handling recommendations include avoiding contact with skin and eyes and avoid dust formation.

The "Health and Safety Element" of the *City of Pittsburg General Plan*, provides specific goals and policies related to the transportation, storage, and usage of hazardous materials and chemicals. The General Plan establishes hazardous materials goals that include minimizing the risk to life and property from the generation, storage, and transportation of hazardous materials and waste by complying with applicable state regulations as well as encouraging redevelopment of areas with potential hazardous materials issues. City policies include measures for preventing the spread of hazardous leaks and spills from industrial facilities to residential neighborhoods and community focal points, and identifying appropriate regional and local routes for the transport of hazardous materials and waste (City of Pittsburg, 2001). The following is a list of the City's relevant goals and policies:

- Goal 10-G-9: Minimize the risk to life and property from the generation, storage, and transportation of hazardous materials and waste by complying with all applicable State regulations.
- Goal 10-G-11: Ensure emergency response equipment and personnel training are adequate to follow the procedures contained within the Emergency Response Plan for a major earthquake, wildland fire, or hazardous substance event.

- Policy 10-P-33: Prevent the spread of hazardous leaks and spills from industrial facilities to residential neighborhoods and community focal points, such as Downtown.
- Policy 10-P-34: Identify appropriate regional and local routes for transport of hazardous materials and wastes. Ensure that fire, police, and other emergency personnel are easily accessible for response to spill incidences on such routes.

Section 10.3 of the General Plan designates certain roadways as acceptable for transport of hazardous materials (City of Pittsburg, 2001), including the following:

- Loveridge Road
- Pittsburg-Antioch Highway
- Tenth Street/Willow Pass Road
- North Parkside Drive

Would the proposed project:

a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Less Than Significant Impact. Access to and from SR 4 follows established truck routes (Tenth Street/Willow Pass to Harbor Street to E. 3rd Street, or Pittsburg-Antioch Highway to Harbor to E. 3rd Street), would be used by employees and contractors to access the facility. There would be one truck trip per week of supplies needed for the process; therefore approximately 36 roundtrip truck trips of hazardous materials would be transported for the life of the pilot project. Most of the travel is using roadways that have been approved by the City for use for transport of hazardous materials to an industrialized area for approximately nine months. Access to the site is via a private road at the end of the public portion of 3rd Street.

As discussed above, the chemicals used in the process are not very reactive under normal conditions therefore proper handling by trained workers would not create a risk to the public or the environment. No hazardous materials would be produced as a byproduct of the process of making carbonate coated aggregate products. Thermal wastewater would be discharged through the 6-inch outfall pipe and would not be in direct contact with other chemicals or materials during the process. Wastewater generated from the washing of material products would be minimized using recycling of water on-site. Impacts associated with routine transport, use or disposal of hazardous materials would be less-than-significant.

b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

Less Than Significant With Mitigation. As described in the project description, the potential for facility upset conditions and accidents would be minimized with design of secondary containments sized to confine the entire contents of stored chemicals, proper training of operators, and having an emergency response plan in place that outlines procedures to quickly react in the event of an accident or spill. Site-Specific Safety Plan to address safety issues specific to the facility would be developed and be consistent with the existing Safety Program and Policies in the SFBA Safety Plan.

According to the California Accidental Release Prevention (CalARP) Program Administering Agency Guidance, 500 lbs (60 gallons) of ammonia concentration of 1% or greater is covered by the CalARP Program. No other chemical provided in Table 12 is included in the CalARP Program. The project description indicates that 0.5-19 wt% ammonia in a quantity of less than 260 gallons (less than 2,100 lbs would be onsite). Ammonia vapor is toxic and a severe irritant of the respiratory system. An ammonia vapor release could create a hazard to the public resulting in a significant impact. Impacts associated with

reasonably foreseeable upset and accident conditions involving the release of hazardous materials would be reduced to less than significant with implementation of Mitigation Measure Hazards-1.

MITIGATION MEASURE:

Hazards-1 Development of Risk Management Plan

A Risk Management Plan (RMP) shall be developed for the use of ammonia concentration of 1% or greater exceeding 500 lbs (60 gallons) per requirements of the California Accidental Release Prevention (CalARP) Program regulation (California Code of Regulations Title 19, Division 2, Chapter 4.5, Section 2750) and EPA Risk Management Program (RMP) 40 CFR Part 68. The RMP shall be incorporated into the Site Specific Safety Plan. Contra Costa County is the designated Certified Unified Program Agency (CUPA) for the facility responsible for approving the RMP. Submittal of the comprehensive risk management program would be required as a condition of project approval and final program approval by the CUPA would be required prior to operation.

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

No Impacts. No existing or proposed schools are located within one-quarter mile of the project site. There a proposed K-12 charter school at the corner of Harbor and E. 3rd Street (Making Waves Academy). However, the proposed school is outside of the quarter mile but still relatively close to the proposed project. There would be no impact associated with hazardous materials within one-quarter mile of existing or proposed schools.

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

Less Than Significant Impact. The project site is located on a 2.5 acre parcel categorized as Voluntary Cleanup site. As provided on the EnviroStor website[19]:

> *Site remedial investigations, prior to the construction of the co-generation power plant, were completed. The investigations determined that soil concentrations of chemicals of concern were higher than the site screening levels USEPA Preliminary Remedial Goals (PRGs). Based on the proposed future land use, the contaminated soil was excavated, consolidated, and capped under the building floors, asphalt pavements, and landscaped areas.*

A Phase 1 environmental site assessment completed in August 2018 by Groundwater & Environmental Services, Inc. verified that the capping infrastructure remains in place sealing any contaminated soil from exposure to the environment and workers. Therefore, the project would have a less than significant impact associated with creating a significant hazard to the public or the environment.

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

[19] Source: https://www.envirostor.dtsc.ca.gov/public/profile_report?global_id=07490047

No Impacts. The project site is not within the vicinity of an approach/departure flight path of a public airport. The nearest airport is the county-owned Buchanan Field Airport located approximately 13 miles to the west of the project area. Therefore, there would be no impact related to airport activities.

f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

Less Than Significant Impact. The City of Pittsburg has an Emergency Operations Plan (EOP) that contains emergency and recovery plans applicable to natural and human induced hazardous situations. The proposed project would be constructed on an existing industrial site that would include a Hazardous Material Business Plan (HMBP), that describes in detail the type and volume of chemicals to be used at the facility, to the Contra Costa Health Services - Hazardous Materials Programs (CCHSHMP). California Health and Safety Code – HSC DIVISION 20 - MISCELLANEOUS HEALTH AND SAFETY PROVISIONS CHAPTER 6.95 - Hazardous Materials Release Response Plans and Inventory ARTICLE 1 - Business and Area Plans Section 25505 requires the HMBP. No potential conflicts have been identified between the operation of the carbon mineralization and sequestration and other local emergency response and evacuation plans, including the Contra Costa County Emergency Operations Plan and Contra Costa County Hazardous Materials Area Plan. Therefore, construction and operation of the proposed project would not impair implementation or operation of the City's EOP or other local emergency response or evacuation plans resulting in a less than significant impact.

g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving wild land fires?

No Impacts. The project site is developed and industrial in nature and does not contain, nor is it adjacent to, any wildlands. The nearby undeveloped areas are adjacent to New York Slough making the area damp and low risk for fire ignition. No impact would occur.

1.10 HYDROLOGY AND WATER QUALITY

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?	☐	☐	☒	☐
b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces, in a manner which would:				
(i) result in substantial erosion or siltation on- or off-site;	☐	☐	☒	☐
(ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site;	☐	☐	☐	☒
(iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	☐	☐	☒	☐
(iv) impede or redirect flood flows?	☐	☐	☐	☒
d) in flood hazard, tsunami or seiche zones, risk release of pollutants due to project inundation?	☐	☐	☐	☒
e) conflict with or obstruct implementation of water quality control plan or sustainable groundwater management plan?	☐	☐	☒	☐

Discussion

The proposed project site is situated along the southern shore of Suisun Bay fronting New York Slough. The bottom of Suisun Bay is predominantly fine silt and clay, crossed by channels scoured by tidal and riverine flows (Schoellhamer, 2001).

The topography of the existing site is essentially flat, but drainage is maintained to Suisun Bay through storm drains. Storm water runoff currently collects and drains via a storm drain system prior to discharging to Suisun Bay.

State Water Resources Control Board's *Water Quality Control Plan For Control Of Temperature In The Coastal And Interstate Waters And Enclosed Bays And Estuaries Of California* is the State Document that

provides the criteria for the discharge of elevated temperature wastes. The criteria that applies to this project is the discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at (a) the shoreline, (b) the surface of any ocean substrate, or (c) the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.

The RWQCB's Municipal Stormwater Permitting Program regulates stormwater discharges from municipal separate storm sewer systems (MS4). Under the program, the RWQCBs have adopted NPDES storm water permits for municipalities; most of these permits are issued to a group of co-permittees encompassing an entire metropolitan area.

The City of Pittsburg is a permittee under the San Francisco Bay Region Municipal Regional Stormwater NPDES Permit (Order No. R2-2009-0074), which was adopted by the RWQCB in 2009. The City has joined together with multiple other municipalities to form the Contra Costa Clean Water Program, which operates as the Contra Costa Permittees entity under the MS4 permit. The MS4 permit outlines stormwater effluent prohibitions and Best Management Practices (BMPs) to be implemented during specific public works operations (e.g., road repair). A regional water quality monitoring program is also part of the permit.

Provision C. 3 of the permit applies specifically to projects undergoing development. Certain projects creating and/or replacing at least 10,000 square feet of impervious surface are required to implement storm water management facilities that are designed and sized to provide treatment to remove pollutants from stormwater runoff. Projects creating and/or replacing at least 1 acre of impervious surface must design stormwater management facilities to provide both stormwater treatment and flow-control functions. This demonstration project would not change the impervious surface area of the existing site.

Would the proposed project:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Less Than Significant Impact. As described in the Project Description, the proposed project site was previously host to a 20-megawatt cogeneration power plant, owned and operated by GWF Power Systems Company, Inc. (GWF). The facility was decommissioned in 2012 and the site has since been an empty lot used for truck parking. The proposed project site has a perimeter chain link fence. As shown on Figure 2 of the Project Description, two buildings remain in place. Site remedial actions, prior to the construction of the GWF plant, resulted in contaminated soil excavation, consolidation and capping under building floors, asphalt pavements and landscaped areas that remain intact. A Phase 1 environmental site assessment carried out in August 2018 by Groundwater & Environmental Services, Inc. verified that the capping infrastructure remains in place sealing any contaminated soil from exposure to the environment and workers.

The construction of the proposed project would not require any disturbance of soil beneath the existing site caps. The majority of the equipment would be skid mounted for mobilization to and from the proposed project site. No new foundation, or new buildings would be constructed on the site. There would be minimal surface grading and no below grade construction of facilities or pipelines.

THERMAL WASTEWATER DISCHARGE

The project would discharge thermal wastewater from the site into the New York Slough. An existing 6-inch diameter outfall pipe previously used for this purpose during the GWF power plant operation, was verified in December 2018 to be in good working condition by inspection. The use of the existing pipe and outfall is contingent upon acceptance by the appropriate regulatory agencies.

The proposed discharge is located at the northeast corner of the project site at 895 East 3rd Street, and extends out into New York Slough through an existing deep-water outfall, the discharge operated under

NPDES Permit No. CA0029106 (now rescinded). The pipe extends approximately 290 ft into the New York Slough.

The project's thermal wastewater discharge to the outfall would be less than 86° F (max daily average), but would likely have a daily average temperature in the range of 75° F. Regional Monitoring Program data from 1993-2008 indicate that the average temperature of Sacramento River / San Joaquin River monitoring stations was 63° F +/-9° F and the range was 49-75° F. Because the flow is very small and the deep-water outfall is equipped with a diffuser, the discharge is unlikely to cause surface water temperatures to rise more than 4° F above receiving water temperatures due to the small volume of discharge entering a large body of water with a temperature 23% higher than ambient temperature at worst case (86 ° F).

The outfall is proposed to discharge for a duration of 12 months from the time of first operation. Expected maximum rate of proposed discharge is 72,000 gallons per day (GPD); expected average rate of proposed discharge is 24,000 GPD. The 6-inch diameter pipe has adequate capacity for this rate of flow.

The project would comply with the requirements for the discharge of thermal wastewater as presented in the State Water Resources Control Board's *Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California*.

For this project: *the discharge of elevated temperature wastes shall not result in increases in the natural water temperature exceeding 4°F at (a) the shoreline, (b) the surface of any ocean substrate, or (c) the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation shall be maintained at least 50 percent of the duration of any complete tidal cycle.*

The source of water that would be discharged is from the Contra Costa Canal aqueduct, before reaching the project site the canal water passes thru a filtering plant owned and operated by UPI. The proposed discharge would not come into contact with any industrial processes and would not result in the addition of chemicals to the discharge.

The previous NPDES permit (CA0029106) that authorized the original use of the cooling water discharge system included the following statement:

The discharge flow is very small compared to the size of the receiving water, the average temperature of the discharge is only slightly elevated over the receiving water temperature, and the deep-water outfall is equipped with a diffuser. For these reasons, the discharge is unlikely to exceed the natural receiving water temperature by more than 20ºF, create an elevated temperature zone larger than 25 percent of the area of New York Slough, or cause surface water temperatures to rise more that 4ºF above receiving water temperatures. No additional limitations appear necessary to protect beneficial uses. (SFRWQCB 2010)

By complying with the thermal limitations for the discharge, the impact during operations on water quality standards would be less than significant due to the low quantity of thermal water mixing with the ambient water in New York Slough.

STORMWATER QUALITY DURING CONSTRUCTION

Runoff of sediment and contaminants during construction activities would be minimized through compliance with the State General Permit for Discharges of Stormwater Associated with Construction Activity (Water Quality Order 2009-0009-DWQ) and a project-specific Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would comply with current SFRWQCB guidelines and would incorporate acceptable BMPs for control of on-site materials, dust, and sediment and stabilization and proper handling of materials in the project area. BMP provisions may include:

- Implementation of hazardous or contaminated materials-handling procedures such as placing materials into lined bins with covering.

- Designation of appropriate parking and fueling areas;
- Deploying applicable dust and runoff-control measures;
- Delineating a site perimeter to prevent disturbing areas outside the project limits;
- Implementing handling and storage procedures for water generated during construction dewatering;
- Implementing hazardous materials storage, containment, and control measures such as secondary containment berms; and
- Diverting upstream run-on safely around or through the construction project.

Stockpiles of spoils would be placed in designated staging areas. The staging area and storm water runoff from the staging area would be managed according to the provisions of storm water Best Management Practices (BMPs). Typical BMPs include installation of gravel bags at drain inlets, and storage containers for preventing rain from coming into contact with chemicals. These are sometimes referred as structural BMPs. Non-structural BMPs are good habits, practices, or strategies. Some examples are doing routine vehicle maintenance off-site rather than on a construction site, educating employees on storm water issues upon hire and as jobsite issues arise. The project is subject to the Regional Water Quality Control Board's industrial discharge permit.

During project construction, lubricants, fuels, and other chemicals used for construction machinery could be spilled during normal usage or during refueling. Spilled material in unpaved areas could infiltrate the soil column, impacting groundwater quality and groundwater supplies. Measures to avoid and control releases such as requirements for secondary containment, spill kits, and regular equipment inspections would be outlined in the Hazardous Materials Business Plan and the Spill Prevention, Control, and Countermeasures Plan, which would be prepared specifically for site construction conditions, as applicable per regulations of the Contra Costa County Hazardous Materials Programs.

To prevent violations of storm water quality standards, best management practices employed during project construction would ensure that impacts to water quality would be minimized and no violations of water quality standards or waste discharge requirements would occur.

STORMWATER QUALITY DURING OPERATIONS

The proposed project would be required to comply with storm water quality requirements, (provision C.3) of the countywide, National Pollutant Discharge Elimination System (NPDES) permit, so as to minimize runoff of storm water from the project site that could violate water quality standards or waste discharge requirements. A Stormwater Control Plan (SWCP) would be prepared for this project which would identify any necessary C.3 measures.

Since the existing site is capped and there would be minimal surface grading as discussed above, with adherence to the SWPPP and its best management practices the impact during construction would be less than significant. With adherence to the SWCP during the operations, the impact during operations would also be less than significant with respect to water quality standards, waste discharge standards, and groundwater quality.

The following plans and reports would be required to be submitted to the City of Pittsburg Building Division and Engineering Division for review and approval prior to the issuance of any building or engineering permits to prevent violation of water quality standards pre- and post-construction:

- Architectural Site Plans
- Stormwater Control Plan and Report;

- Stormwater BMP Operation and Maintenance Plan; and
- Erosion and Sedimentation Control Plan (SWPPP).

In summary, impacts associated with violating water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality during construction or operations would be less than significant as a result of compliance with federal, state and local regulations.

b) Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

No Impacts. The proposed project would be served by non-potable canal water from UPI, recycled water and the municipal water supply. The project would not require the installation of any new groundwater wells, nor would the proposed project impede the recharge of groundwater. The Project would not increase impervious areas and would not decrease direct rainfall infiltration on the project site. However, as described in "a" above, the proposed project must comply with NPDES permit requirements that specify that post-project runoff must not exceed pre-project rates (Stormwater C.3 Guidebook). Any existing groundwater infiltration is not expected to change.

The project does not include below grade construction of facilities and pipelines. The project would not impact groundwater quality or supply. Therefore, no potential impacts to groundwater or groundwater management from project construction and operations would occur.

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or through the addition of impervious surfaces in a manner which would result in substantial erosion or siltation on- or offsite?

i.) result in substantial erosion or siltation on- or off-site

Less Than Significant Impact. The project would not alter existing drainage patterns or result in erosion or siltation because the components of the facility would be built on the existing ground surface with no excavation and minimal surface grading. The project would adhere to necessary C.3 provisions to prevent siltation in the storm drains. Due to the lack of ground disturbance from existing conditions, the project would have less than significant impact on existing drainage patterns or changes to impervious surface areas.

ii.) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on-or off-site

No Impacts. The pilot project would not change the site's impervious area or provide opportunity for increased flooding on or off-site. The site is currently almost entirely impervious and would remain so after the installation of the of the project components. The duration of the Pilot Project would be approximately one year. During this time the project would not construct any new foundations or create any permanent structures. During construction and operation there would be no impacts associated with increasing the rate or amount of surface runoff that would result in flooding on-or off-site.

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

Less Than Significant Impact. During construction and operations, the project would not generate any new or increased sources of runoff from the site. The site would not create additional polluted runoff as discussed previously in "a". The impact of contributing runoff water that exceeds the capacity of the existing stormwater drainage system or provide substantial additional sources of polluted runoff would be less than significant.

iv.) impede or redirect flood flows?

No Impacts. The project site currently has an existing storm drain system on-site that would be used to collect and convey stormwater and drain the site. The site currently drains via on-site storm drainage inlets to underground storm drainage pipes that carry the drainage via gravity flow over to the Northeast corner of the project site to an outfall structure that discharges into the New York Slough. A concrete headwall and wingwalls and a flap gate at the end of the 15-inch storm drain pipe exist at the outfall structure. During construction of the project, the storm drain system would be restored to full functionality. The project site would continue to collect and convey stormwater in the same manner as currently done. Therefore, during the construction and operations of the project site, flood flows would not be impeded or redirected resulting in no impact.

d) in flood hazard, tsunami or seiche zones, risk release of pollutants due to project inundation?

Less Than Significant Impact. The project site is located outside of the 100-year flood plain as determined by FEMA's flood maps. The site is identified as being in Zone X, Area of Minimal Flood Hazard.

The project area is located near but outside a tsunami hazard area as identified on the My Hazard's interactive web site: Myhazards.caloes.ca.gov, maintained by the State of California's Office of Emergency Services.

No other hazards were identified on the project site. The project would not be susceptible to a seiche (a wave in an inland water body).

Based on the findings presented above, no hazards were determined from the FEMA 100-year flood, a tsunami or seiche. The potential impact of pollutants being released on the site as a result of inundation from these hazards during construction and operation would be less than significant.

e) conflict with or obstruct implementation of water quality control plan or sustainable groundwater management plan?

No Impacts. The City of Pittsburg developed the Groundwater Management Plan: Pittsburg Plain Groundwater Basin in 2012 with the objective to provide a long-term strategy to maintain the quality, reliability, and sustainability of groundwater resources within the Pittsburg Plain Groundwater Basin.

During construction and operation, the project would have no conflict with or obstructions of the implementation of the water quality control plan or the sustainable groundwater management plan. The project would prepare and implement the water quality control plan in compliance with C.3 as previously discussed in "a". Due to the capped nature of the project site as previously discussed in "a" the project site would not impact the groundwater or interfere with the implementation of the Groundwater Management Plan: Pittsburg Plain Groundwater Basin.

1.11 LAND USE AND PLANNING

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b) Cause a significant environmental impact due to a conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒

Discussion

Would the proposed project:

a) Physically divide an established community?

No Impacts. The project site is currently occupied by and is zoned for industrial uses. The site is surrounded by industrial uses to the east and west, and vacant land uses to the south, and vacant land and the New York Slough of the Suisun Bay to the north. The proposed project is located in the northwestern portion of the Northeast River Planning Subarea. This Subarea is primarily characterized by established, large-scale heavy industrial operations. Therefore, development of the site would not physically divide an established community. No impact would occur.

b) Cause a significant environmental impact due to a conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?

No Impacts. According to the City of Pittsburg General Plan, the project site has a land use designation of Industrial and according to the PMC, the site is zoned as General Industrial (IG) District, which allows for industrial uses. The proposed project is an industrial facility with storage/handling of hazardous materials and the project fits within the specified activities described in the IG zoning district of the PMC, subject to the approval of a use permit and design review. The City must grant the required use permit before the use can be established as proposed in the submitted application.

The project site is under the jurisdiction of the ECCCHCP as discussed in section 1.4 Biological Resources. However, the project site contains industrial land uses and is designated by the ECCCHCP as having "urban" land cover. Furthermore, the proposed project would not acquire additional land, as all elements of the proposed project would reuse or assemble industrial facilities on a developed industrial site. The proposed project would be in compliance with all land use plans, policies, and regulations, and thus would have no impact with regard to these issues.

1.12 MINERAL RESOURCES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

Discussion

Would the proposed project:

a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?

No Impacts. According to the City of Pittsburg General Plan Resource Conservation Element, there are currently no significant mineral deposits or active mining operations in the City. Furthermore, the project site is located on a currently developed industrial site. As a result, the proposed project would have no impact related mineral resources.

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

No Impacts. Same as "a" above.

1.13 NOISE

Would the project result in:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

Discussion

Section 9.44.010 (Prohibitions) of the City of Pittsburg's Municipal Code prohibits the operation of any pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist (or other appliance) between the hours of 10:00 p.m. to 7:00 a.m. Section 18.82.040 (Noise) identifies noise level performance standards and states that no construction event or activity occurring on any site adjoining a lot in a residential, planned development or government and quasi-public districts shall generate loud noises in excess of 65 decibels measured at the [receiving noise-sensitive] property line, except between the hours of 8:00 a.m. and 5:00 p.m. Construction and operations would occur in one eight hour shift per day between 8:00 am to 5:00 pm.

The materials handling process equipment would generate some noise, it is not anticipated that the noise level would exceed 85 dBA (adjusted decibels) during an eight (8) hour exposure time.

Facility construction includes the following equipment to assemble the components of the carbon capture and mineralization facility:

Forklift (1) Loader (1)

Dump truck (1) Transporter truck (1)

Construction of the proposed project would result in a temporary increase in ambient noise levels within the project vicinity. The nearest noise-sensitive receptors are located approximately 2,500 feet away from the project area. The duration of construction of the proposed project is anticipated to be approximately 3 to 4 months.

Would the proposed project result in:

a) generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Less Than Significant Impact. The proposed project would be in an area of existing industrial land use, and no noise sensitive land uses adjoin the proposed site. The nearest resident is at a distance of approximately 2,500 feet on E. Santa Fe Avenue. The loader would likely produce the most noise during construction at 85 DBA at 50 feet from source (FTA 2006). At 2,500 feet away it should be significantly lower, and the loader would not be in operation 8 hours a day for four months. Including the effects of local shielding from buildings, topography, walls or other barriers, which may reduce sound levels further. Noise due to temporary construction activities is therefore not expected to exceed 65 decibels at the nearest noise-sensitive land use. Excessive construction noise would not be generated outside of the hours of 8:00 am to 5:00 pm. The operational equipment would also be at the 65 db level to the nearest receptor. Operations would not be running outside of the hours of 8:00 am to 5:00 pm. Therefore, impacts associated with increased noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies would be less than significant.

b) Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels?

Less Than Significant Impact. High levels of groundborne vibration can cause architectural or structural damage to nearby buildings. The threshold at which there is a risk of architectural damage to normal dwelling structures (i.e., cracks in plastered walls and ceilings) is a peak particle velocity of 0.2 inches per seconds (Caltrans 2002). Table 13 provides vibration levels for typical construction equipment, based on the application of the Caltrans-recommended standard.

Table 13: Construction Equipment Vibration Amplitudes[20]

Equipment	Reference peak particle velocity (PPV) at 25 ft. (in/sec)
Large Bulldozer	0.089
Loaded Trucks	0.076
Small Bulldozer	0.003

The vibration levels presented in Table 13, ground vibration generated by heavy-duty equipment would not be anticipated to exceed 0.089 inches per second peak particle velocity at 25 feet. Vibration generated during operations also would not exceed the vibration criteria as the equipment would be located on the other side of the existing building at the south end of the site near the entrance resulting in more than 2,500 feet from the nearest receptor. Impacts related to excessive ground borne vibration or ground borne noise levels would be less than significant.

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

[20] Source: Caltrans 2004

No Impacts. The nearest airport is the county-owned Buchanan Field Airport located approximately 13 miles to the west of the Project area. Thus, implementation of the project would not result in airport noise impacts on people residing or working within the project area. There would be no impact.

1.14 POPULATION AND HOUSING

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

Discussion

Would the proposed project:

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

No Impacts. The proposed project does not propose the construction of new homes or require the expansion of existing infrastructure that may directly or indirectly result in population growth. It is anticipated that approximately three employees would be required to operate the facility. The maximum of six construction crew members at any one-time during construction would be drawn from the local or regional labor pool. As a result, the proposed project would have no impact on population growth.

b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?

No Impacts Construction of the proposed upscaled concrete production facility would occur within an existing industrial site and would not result in the displacement of people. Therefore, the proposed project would have no impact on existing housing.

1.15 PUBLIC SERVICES

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
(i) Fire protection?	☐	☐	☒	☐
(ii) Police protection?	☐	☐	☒	☐
(iii) Schools?	☐	☐	☐	☒
(iv) Parks?	☐	☐	☐	☒
(v) Other public facilities?	☐	☐	☐	☒

Discussion

Would the proposed project:

a) Result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:

i.) Fire protection?

Less Than Significant Impact. Construction and operation of the proposed project facility would not substantially increase the need for fire protection services. In the unlikely event of a fire or hazardous material release at the proposed project facility, the CCCFPD would initially respond. Stations 84 and 85 are nearest to the proposed project site, are fully equipped and staffed in accordance with current CCCFPD policies. Station 85, located at 2331 Loveridge Road, is 3.3 miles from the proposed project area. Fire Station 84 at 1903 Railroad Ave. in Pittsburg, is located 2.1 miles from the proposed project.

The Applicant would be required to construct and operate to current building and fire life safety codes complying with the rules and regulations set forth by the CCCFPD. As such, construction and operation of the proposed project would not create significant fire hazards that would substantially increase the need for fire protection services and would not require the construction of new or expanded facilities to meet any increased need. Therefore, impacts on fire protection services as a result of the proposed project would be less than significant.

ii.) Police protection?

Less Than Significant Impact. Construction and operation of the proposed project facility would not substantially increase the need for police services. In the event of an emergency, the Pittsburg Police Department (PPD), operating from City Hall, at 65 Civic Avenue is approximately 1.9 miles west of the proposed project and would initially respond. In the event all PPD personnel were dispatched on calls, the County Sheriff would be dispatched (CCC Sheriff 2019, personal communication).

There are no residential or recreational land uses proposed as part of the proposed project, so there would not be an increase the amount of people near the facility which could increase the need for police presence. Impacts on police protection services as a result of the proposed project would be less than significant.

iii.) Schools?

No Impacts. Public school services in the project area are provided by the PUSD. The proposed project would not include new housing or directly increase the project area residential population. The additional six construction workers for 3 to 4 months of construction and the three staff operating the facility for 12 months would not increase the local population. Consequently, proposed project would not increase student enrollment levels at PUSD schools and therefore, no impacts would occur.

iv.) Parks?

No Impacts. The proposed project does not feature a housing element, nor would it directly increase population so as to increase demand on parks. The proposed project would include three operations personnel at the facility. The six construction workers would only be present for up to four months and would likely be drawn from the local workforce. The proposed project would not provide, alter, or affect demand for parks and recreational facilities. Therefore, no impacts to parks would occur.

v.) Other public facilities?

No Impacts. No impact to other public facilities would occur as a result of implementation of the proposed Project.

1.16 RECREATION

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

Discussion

a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

No Impacts. The proposed project does not include any new residential development. The additional six construction workers for 3 to 4 months of construction and the three staff operating the facility would not increase the local population. As a result, the proposed project would not result in an increase in population or housing in the City of Pittsburg. Thus, the proposed project would not increase demand for or use of local recreational facilities. As a result, the proposed project would have no impact.

b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?

No Impacts. The proposed project does not include construction of recreational facilities, nor (as described above under "a") would it indirectly require the expansion of existing recreational facilities. As a result, potential physical effects on the environment from the construction of new or expansion of existing recreational facilities would not occur. Thus, no impact would occur.

1.17 TRANSPORATION

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Conflict with a program, plan, ordinance or policy addressing the circulation system including transit, roadway, bicycle and pedestrian facilities?	☐	☐	☒	☐
b) Conflict or be inconsistent with CEQA Guidelines section 15064.3 subdivision (b)?	☐	☐	☒	☐
c) Substantially increase hazards due to geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☒	☐	☐
d) Result in inadequate emergency access?	☐	☐	☐	☒

Discussion

Pittsburg-Antioch Highway is the closest route of regional significance to the proposed project. Pittsburg-Antioch Highway is major route that serves as an alternative route to SR 4 for regional commuters. It is an east-west aligned major arterial that roughly parallels the north side of SR 4, and has one to two travel lanes in each direction. The road ends at Harbor Street to the west and at Somersville Road to the east, in Antioch. Harbor Street is the closest major cross street to the proposed project on East 3rd Street.

According to the Pittsburg General Plan State Route 4 has been heavily congested in the westbound direction during the weekday morning peak period (7:00 to 9:00 AM) and in the eastbound direction during the evening peak period (4:00 to 6:00 PM). Based on Caltrans' mainline counts, volumes on State Route 4 range from nearly 80,000 to over 90,000 vehicles per day in the vicinity of Pittsburg. Weekday volumes generally peak between 5:00 to 6:00 PM, with peak hour traffic volumes at nearly 8,000 vehicles per hour. (Pittsburg 2001)

The Congestion Management Program (CMP) was enacted by the State legislature following the passage of Proposition 111 in 1990. The purpose of the CMP is to address the impact of local growth on the regional transportation system. The Metropolitan Transportation Commission, the local CMP agency, has designated a highway network that includes all State highways and principal arterials within the County. Local jurisdictions are required to monitor the Level of Service (LOS) standards at the designated locations within this network.

Would the proposed project:

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

Less Than Significant Impact. The construction would take up to twelve weeks. During the twelve-week period, there would be approximately six trips daily generated by the construction crew. There would be less than a dozen material delivery total trips during construction. During an 8-hour day of operation

roughly three (3) round trip trucks per day for a total of six vehicle round trips per day in combination with worker's travel to and from the project site.

The number of peak hour trips generated as a result of the proposed project does not meet or exceed the City Traffic Engineering Divisions threshold for requiring a Traffic Impact Study (TIS). Therefore, a TIS was not required as part of this Initial Study. The project would not conflict with a with a program, plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle and pedestrian facilities resulting in a less than significant impact to transportation.

b) Conflict or be inconsistent CEQA Guidelines section 15064.3 subdivision (b)?

Less Than Significant Impact As summarized from "a" above, construction would generate less than ten added trips per day. Operations would generate an additional six trips per day. The proposed project would not generate a significant impact in either the AM or PM peak-hour timeframes at any of the intersections in the project vicinity, therefore the LOS would not change at any of the intersections in the project vicinity as required to be monitored by the City as part of the CMP resulting in a less-than-significant impact related to transportation.

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

Less Than Significant Impact with Mitigation. During operations there would be three full truck roundtrips per day. Trucks filled with upscaled rock product or RCA could spill materials on roadways. This could increase traffic hazards or require the City to provide additional street cleanup on transport routes resulting in a significant impact. Implementation of Mitigation Measure Traffic-1 would reduce hazards created by potential material spillage to less than significant.

MITIGATION MEASURE:

Trans-1: Control Spillage of Hard Substrate Materials from Hauling Trucks.

All Trucks carrying RCA, carbonate coated aggregate, or remediated RCA aggregate shall be covered and have at least six inches of freeboard in the truck bed during transport to eliminate spillage of materials onto the roadway.

d) Result in inadequate emergency access?

No Impacts. The property does not abut a public right of way; pedestrian access from the nearest public roadway does not exist. Access to the site is via a private road at the end of the public portion of 3rd Street. There is a wide gated entrance to the facility for large equipment. Construction would not include any roadway blockage. The proposed project would have no impacts associated with inadequate emergency access.

1.18 Tribal Cultural Resources

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native tribe and that is:				
(i) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historic resources as defined in Public Resources Code 5020.1(k), or	☐	☐	☒	☐
(ii) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☒	☐

Discussion

On July 1, 2019, the City completed the California Native American tribal consultation process by providing notification of the nearby project to the following tribal representatives.

- Andrew Galvan, Chairperson Ohlone Indian Tribe of the SF Bay Area
- Ann Marie Sayers, Chairperson Indian Canyon Mutsun Band of Castanoan
- Charlene Nijmeh, Chairperson Muwekma Ohlone Indian Tribe of the SF Bay Area
- Katherine Erolinda Perez, Chairperson North Valley Yokuts Tribe
- Irenne Zwierlein, Chairperson Amah Mutsun Tribal Band of Mission San Juan Bautista
- Raymond Hitchcock, Chairperson, Miwok, Wilton Rancheria
- Antonio Ruiz, Cultural Resources Officer, Miwok, Wilton Rancheria

To date, no response has been received from any of the representatives.

a) Would the proposed project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native tribe and that is:

i.) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historic resources as defined in Public Resources Code 5020.1(k), or

The project area has been previously disturbed and permanently capped. Construction of the project would not include any ground disturbing activities. The Project's impact to listed or eligible for listing in the California Register of Historical Resources or a local register is less than significant.

ii.) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe

See "i" above.

1.19 UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?	☐	☐	☒	☐
b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?	☐	☐	☒	☐
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☒	☐
d) Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals?	☐	☐	☒	☐
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☒	☐

Discussion

Wastewater. The Delta Diablo Sanitation District ("Delta Diablo") provides water resource recovery services for the cities of Pittsburg and Antioch, and the unincorporated community of Bay Point, serving a total population of nearly 200,000. The water resource recovery services consist of secondary treatment of wastewater, recycled water production and distribution, pollution prevention, energy recovery, beneficial reuse of biosolids, street sweeping, and household hazardous waste collection. Delta Diablo owns and operates the regional interceptors and collection system that transports wastewater to the Delta Diablo Wastewater Treatment Plant (WWTP), located north of the Pittsburg-Antioch Highway along the Pittsburg city limits, about 0.6 miles east of the proposed project site. Delta Diablo's WWTP is a secondary treatment plant with a rated average dry weather flow (ADWF) capacity of 19.5 mgd. Treated and disinfected secondary effluent is discharged to New York Slough. A portion of the effluent is diverted to the Recycled Water Facility (RWF) in Antioch prior to chlorination at a varying rate depending on recycled water demands (DDSD, 2006).

Water used for cooling in the Process would be discharged through the outfall pipe that exits at the northeast corner of the project site into New York Slough for 12 months from the time of the initial operations of the pilot project. The average discharge would be 24,000 gallons per day and the maximum discharge would be 72,000 gallons per day. The discharge to the Slough would not come into direct contact with the facility

processes. Any thermal wastewater discharge to the New York Slough would adhere to San Francisco Bay Regional Water Quality Control Board's Thermal Plan that prohibits thermal waste discharges with a maximum temperature greater than 4 °F above ambient temperature of the receiving water. Other wastewater generated from the washing of material products would be minimized, utilizing recycling systems on-site and storing collected wastewater in tanks for treatment prior to disposal.

Wastewater discharges would be monitored according to the relevant limit values for specific parameters outlined in compliance documents received during the permitting process. The parameters are anticipated to include temperature, hardness, total chlorides, conductivity and metals. Monitoring of the wastewater would be done at least one (1) time during the planned 12-month operational duration, likely just after commissioning of the Facility and, if deemed necessary, after approximately 500 hours of the Facility being in operation.

Monitoring would consist of internationally accepted standardized sampling, analysis, and quality assurance methods (e.g., ISO standards). Analyses would use the State Water Board's Thermal Plan (for thermal wastewater discharge) and the City's urban wastewater treatment (for discharge to sewer) for exceedance thresholds.

Stormwater. The stormwater infrastructure on the project site exists from the previous land owners. Stormwater runoff is collected by several catch basins and storm drainpipes that convey water to a flap gate exit for the 18-inch diameter storm drain on New York Slough. The stormwater collection and conveyance system was originally designed to accommodate stormwater runoff associated with industrial land uses.

Non-potable Water Supply. The Process would use non-potable water for non-contact process cooling, washing of material products, and to replace evaporative losses of process water. The source of non-potable canal water would be from the eastern neighbor USS-POSCO Industries (UPI), via their water rights to the Contra Costa Canal aqueduct. The canal is managed by the Contra Costa Water District (CCWD) and is delivered to UPI through a two-mile pipeline system owned and maintained by UPI. UPI also owns and operates a filter plant at its facility in Pittsburg, located to the south and to the east of the project site, through which it treats all canal water received from the CCWD. UPI controls an existing 6-inch pipe (previously constructed by GWF) running from its facility to the project site. It is estimated that a 1-inch meter would be needed to measure the quantities of water delivered to the project.

The Facility would use a closed process water loop for cooling; this process water does not come in direct contact with any other water in the Facility. It is anticipated that during operations, the Facility would use less than 30 gallons per minute (gpm) of water to wash the products, with less than 10% of this volume being used as mist for dust control. In addition, the estimated quantity of make-up water during operations is less than 50 gpm and is anticipated to come from the UPI non-potable water and from City water.

Potable Water Supply. The City obtains approximately 90 percent of its untreated water supply from the CCWD through the Central Valley Project (CVP). The CCWD's current contract for its entire service area is for 195,000 AFY or 174 million gallons per day (mgd). However, these allocations are subject to regulatory or other temporary restrictions that may be imposed arising from drought or other conditions. In addition to its CVP contract and Los Vaqueros Water Rights, CCWD has negotiated water rights with a number of local districts and private entities, including the East Contra Costa Irrigation District. These agreements bring CCWD's total annual supply to 242,700 AFY. The City supplements its CCWD water supply with two wells, located at City Park and at Dover Way/Frontage Road. Combined yield of both wells in Pittsburg is 1,500 AFY. (City of Pittsburg, 2001)

Solid Waste. The trash enclosure at the facility is sized to accommodate a dumpster with at least ten (10) cubic yards of capacity. The municipal waste service provided by Mt. Diablo Resource Recovery would empty this dumpster as needed during construction. All products from the Facility are anticipated to be used

as construction materials in building products; any other solid waste from operations would be contained in the dumpster in the trash enclosure and would be emptied as scheduled with Mt Diablo Resource Recovery.

Electricity and Gas Service. Pacific Gas & Electric (PG&E) has gas and electric hookups at the site. The last "new construction" was in 2013 (for electric) and the site was last inspected by PG&E in 2014. The main electric connection is 400A/480V/3-phase with meter (currently in service), and the site does have additional single phase meters. It is anticipated that the Process would be powered with 100% renewable electricity available from the grid through the City of Pittsburg's participation in Contra Costa County's CCE program provided by MCE Contra Costa.

Would the proposed project:

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

Less Than Significant Impact. The proposed project would not produce any change in the anticipated volume of storm water drainage to be discharged because it is being constructed on existing impervious ground. The project would use existing power connections from the previous property owners. The gas-fired steam boiler would be used temporarily until the flue gas connection with LMEC can be developed. The majority of the wastewater would be discharged into New York slough. A portable restroom facility would be used onsite during construction and by the three employees and any visitors during operations. Telecommunication would require one connection. Recycled water would be used for washing of materials and reused onsite as much as possible. Potable water would only be used by the three employees onsite. The minimalist approach to use of facilities and natural resources during this pilot project would result in less than significant impacts to water, wastewater treatment, stormwater drainage, electric power, natural gas, or telecommunications facilities and would not require new or expanded facilities.

b) Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?

Less Than Significant Impact. The primary water used in the project is for cooling during the Process. The source of water would be USS-POSCO Industries via their water rights to the Contra Costa Canal aqueduct that runs through central Contra Costa County. The washing and rinsing of product materials would use recycled water. Since the water being used for cooling is through existing water rights it has already been accounted in allocations and would not require an additional water supply. Therefore, there is sufficient water supply regardless of the type of water year resulting in a less than significant impact.

c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?

Less Than Significant Impact. The estimated maximum thermal wastewater generated during operations is 50 gpm that would be discharged through the existing outfall at the site. Wastewater from washing and rinsing of product material, anticipated to be less than 30 gpm (0.036 mgd), would be collected and sent to the City sewer system in accordance with the City of Pittsburg's Clean Water Program. Delta Diablo's WWTP has a rated average dry weather flow (ADWF) capacity of 16.5 mgd and peak wet weather flow (PWWF) treatment capacity of 26.0 mgd. The volume of wastewater discharged to the sewer system would be 0.2 percent of the dry weather capacity of Delta Diablo's WWTP resulting in a less than significant impact to wastewater treatment capacity for Delta Diablo Sanitation District.

d) Generate solid waste in excess of State or local standards or in excess of the capacity of local infrastructure or otherwise impair the attainment of solid waste reduction goals

Less Than Significant Impact. Construction debris would be removed during the construction process and would include separation of materials that can be recycled. Solid waste would primarily consist of packaging from shipment of the prefabricated equipment being put together to create the modules of the Process. The developed byproducts of the process would be reused as part of the process and not generate a new stream of solid waste. The trash enclosure at the facility would accommodate a dumpster with at least ten (10) cubic yards of capacity. As a worst case scenario, if the dumpster was completely filled every week during construction and operation, the total volume of solid waste would be approximately 600 cubic yards (162 tons) of waste for the entire construction and operation duration. The Mt. Diablo Resource Recovery Conditional Use Permit granted from the City has a permitted tonnage of municipal solid waste transferred and processed at the Pittsburg facility of 2,700 tons per day (TPD) (Pittsburg 2018). The tons of waste added by the total project construction and operation would be 6% of one day's authorized waste acceptance to the Mt. Diablo Resource Recovery Park in Pittsburg therefore the impact of the project's generated solid waste on local infrastructure or solid waste reduction goals would be less than significant.

e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

Less Than Significant Impact. As discussed in "d" above the minimal waste would be generated during construction. The Process output does not generate any solid waste so waste during operations would result in minimal amounts from packaging removed from supplies or replacement equipment. Therefore, impacts to reduction statutes and regulations related to solid waste would be less than significant.

1.20 WILDFIRE

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

Discussion

Would the proposed project:

a) Substantially impair an adopted emergency response plan or emergency evacuation Plan?

Less Than Significant Impact. As discussed in Section 1.9 Hazards and Hazardous Materials, the City of Pittsburg has an Emergency Operations Plan (EOP) that contains emergency and recovery plans applicable to natural and human induced hazardous situations. No potential conflicts have been identified between the operation of the carbon capture and mineralization facility and other local emergency response and evacuation plans, including the Contra Costa County Emergency Operations Plan and Contra Costa County Hazardous Materials Plan. Therefore, construction and operation of the proposed project would not impair implementation or operation of the City's EOP or other local emergency response or evacuation plans resulting in a less than significant impact.

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

Less Than Significant Impact. The project site has previously been developed and is industrial in nature. The area does not contain, nor is it adjacent to, any wildlands. The area is generally on level ground bounded to the north by New York Slough; to the east by land owned by USS-POSCO Industries (UPI) and by a PG&E substation; to the south by an easement that runs along East 3rd Street; and to the west by Koch Carbon Inc. The developed area surrounding the facility is also industrial. The CCCFPD Stations 84 and 85 are nearest to the proposed project sites, are fully equipped and staffed in accordance with current CCCFPD policies and are 2.1 and 3.3 miles from the facility. The area is not susceptible to the spread of

uncontrolled wildfire; therefore the project would have a less than significant impact associated with exacerbating wildfire risks.

c) Require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, powerlines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?

Less Than Significant Impact. The carbon capture mineralization facility would have process structures on top of an existing asphalt and cement cap. The facility would be constructed on top of the impervious surface with equipment that is easily connected and unconnected. The facility would include storage of chemicals used in production. As provided in the Project Description, the project would include the development of an industrial fire safety plan consistent with applicable standards and fire codes. Fire systems that would be in place include fire extinguishers, fire sprinkler and smoke and fire alarm systems as required, as well as exit signs and emergency lighting. There would be no associated infrastructure of the facility constructed or operated that would exacerbate fire risk resulting in less than significant impacts.

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

No Impacts. As discussed in "a" above the facility is on flat ground adjacent to the Sacramento/San Joaquin Delta in an industrial zoned area of the City that is not susceptible to wildfires or contains slopes or drainages that would create post fire impacts. Therefore, the project would not have an impact associated with exposing people or structures to significant risks, including downslope or downstream flooding or landslides as a result of runoff, post-fire slope instability or drainage changes.

1.21 MANDATORY FINDINGS OF SIGNIFICANCE

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☒	☐

Discussion

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

The project would have no impact on cultural resources that could be present in the area because the project site was previously disturbed and capped with cement and asphalt and no subsurface excavation would occur as part of the project. Biological resources along the shoreline of New York slough would not be impacted because construction and operation of the project would avoid habitat in that area. Implementing Mitigation Measures Bio-1, Bio-2 and Bio-3 that include: precautions to avoid release of toxic substances into aquatic environments, educate workers, provide fencing or staking of sensitive areas, and avoiding disturbance of those areas during project operations except for the discharge of stormwater through existing system and cooling water through the existing deep water outfall. Raptors and migratory birds that could be using trees onsite would be protected during construction from disturbance during nesting season (February 1 through August 31) with the implementation of Bio-4 that would require a survey performed by a qualified biologist no more than two weeks prior to the initiation of work. If birds are present, buffers, monitoring and contacting CDFW and/or the USFWS, depending on the species, would occur to avoid disturbance. Therefore impacts associated with substantially reducing the habitat of a fish or wildlife species, causing a fish or wildlife population to drop below self-sustaining levels, threatening to eliminate a plant

or animal community, substantially reducing the number or restricting the range of a rare or endangered plant or animal would be less than significant with implementation of Mitigation Measures Bio1-4.

b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?

The goal of the project and of the technology being developed by the Applicant is to sequester CO_2 into construction materials. If the pilot project is successful and the Applicant moves forward with full scale operations, the project may provide regional, statewide or larger positive effects that could reduce GHG emissions on a much larger scale in the future.

This pilot project is a small, first of a kind facility that may result in a carbon negative yield. Part of the applicant's operations would be experimenting with different elements of the process to optimize and refine process models with actual field data. At the highest output of the process, the quantity of CO_2 captured would the same quantity that is sequestered in the aggregate rock products (and eventually to concrete). The use of gas-fired steam boiler process equipment is a project option because the flue gas from the power plant may not be accessible when the project is ready for operation, in the interim the Applicant needs to supply its own source of flue gas. However, the use of the steam boiler flue gas results in greenhouse gas emissions that are below BAAQMD allowable thresholds of 10,000 MT CO_{2e} per year. This pilot project would provide operational testing results that would be applied to a permanent project that would be analyzed under CEQA. The project is intended to result in a carbon negative input to the environment. Implementation of Mitigation Measure Air-1 Minimize Dust Generation would reduce PM_{10} and $PM_{2.5}$ levels from concentrations that could be cumulatively considerable in the local area.

Therefore, the project's contribution to cumulatively considerable impacts would be less than significant because it is well below threshold limits for greenhouse gases, and the project is targeting results that would generate a carbon negative outcome in the future. Also, PM_{10} and $PM_{2.5}$ levels would be reduced as much as possible with surface wetting of the site three times a day.

c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

The goal of the project is to take waste products (flue gas and recycled/crushed concrete aggregate (RCA)) to produce carbon sequestered building materials. The final product would exceed ASTM C33 Standard Specification for Concrete Aggregates that defines the quality of aggregate for use in concrete. The developed products would reduce the need to mine raw materials to produce concrete products overall reducing energy consumption in construction. The ultimate process would reduce the release of flue gas into the atmosphere. The amount waste generated by the project is minimal due to the recycling of intermediate byproducts in the process. Impacts to the community from a potential release of ammonia in concentrations of 1% or greater would be reduced to less than significant with implementation of Mitigation Measure Hazards-1. Potential for an increase in debris on roadways would be reduced to less than significant by implementation of Trans-1. Therefore, the project would have a less than significant impact on human beings directly and indirectly.

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Appendix A

AIR QUALITY CONFORMITY ASSESSMENT
SAN FRANCISCO BAY AGGREGATES (SFBA)
PITTSBURG, CA

Submitted to:

Ms. Christie Robinson
Brezack & Associates Planning
3000 Citrus Circle, Suite 210
Walnut Creek, CA 94598

Investigative Science and Engineering, Inc.
Scientific, Environmental, and Forensic Consultants

P.O. Box 488
Ramona, CA 92065
(760) 787-0016
www.ise.us

ISE Project #19-004

May 13, 2019

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INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The San Francisco Bay Aggregates (SFBA) project site (APN 073-020-019-3) consists of approximately 2.5 gross acres, located at 895 East 3rd Street, Pittsburg, CA (Contra Costa County), as shown in Figure 1 on the following page. Regional access to the site is obtained from East 3rd Street via Harbor Street. The site is located within 2,500 feet, or greater, of nearby sensitive residential receptors as shown in Figure 2 on Page 3 of this report.

Surrounding land uses consist of the New York Slough, Suisun Bay, and part of the Sacramento-San Joaquin River Delta to the immediate north, and heavy industrial uses to the immediate east, west, and south (inclusive of East 3rd Street). These features can be seen in Figure 3 on Page 4 of this report.

Finally, the proposed project area resides as a fully disturbed land use, which was formerly the location of a 20-megawatt cogeneration power plant decommissioned in 2012. Two buildings remain in place as part of this previous use, with the remainder of the site remaining relatively open as a single building pad. Elevations across the property average approximately 13 feet above mean sea level (MSL).

Project Description

The SFBA project would temporarily construct a pilot process plant to perform carbon capture and mineralization producing new "CO_2 sequestered" and "upcycled" rock products as shown in Figure 4 on Page 5 of this report. These upcycled rock products would be sold to Bay Area businesses, governments and consumers for use in a wide range of low carbon and high performance concrete applications.

Air Quality Definitions

Air quality is defined by ambient air concentrations of specific pollutants determined by the Environmental Protection Agency (EPA) to be of concern with respect to the health and welfare of the public.[1] The subject pollutants, which are monitored by the EPA, are carbon monoxide, sulfur dioxide, nitrogen dioxide, ozone, respirable 10- and 2.5-micron particulate matter, volatile organic compounds, reactive organic gasses, hydrogen sulfide, sulfates, lead, and visibility reducing particles. Examples of these EPA monitored pollutant sources and their effects on localized air quality are shown in Table 1 starting on Page 6. The EPA has established ambient air quality standards for several of these pollutants with recent case law examining the health impacts of each of the regulated pollutants.[2]

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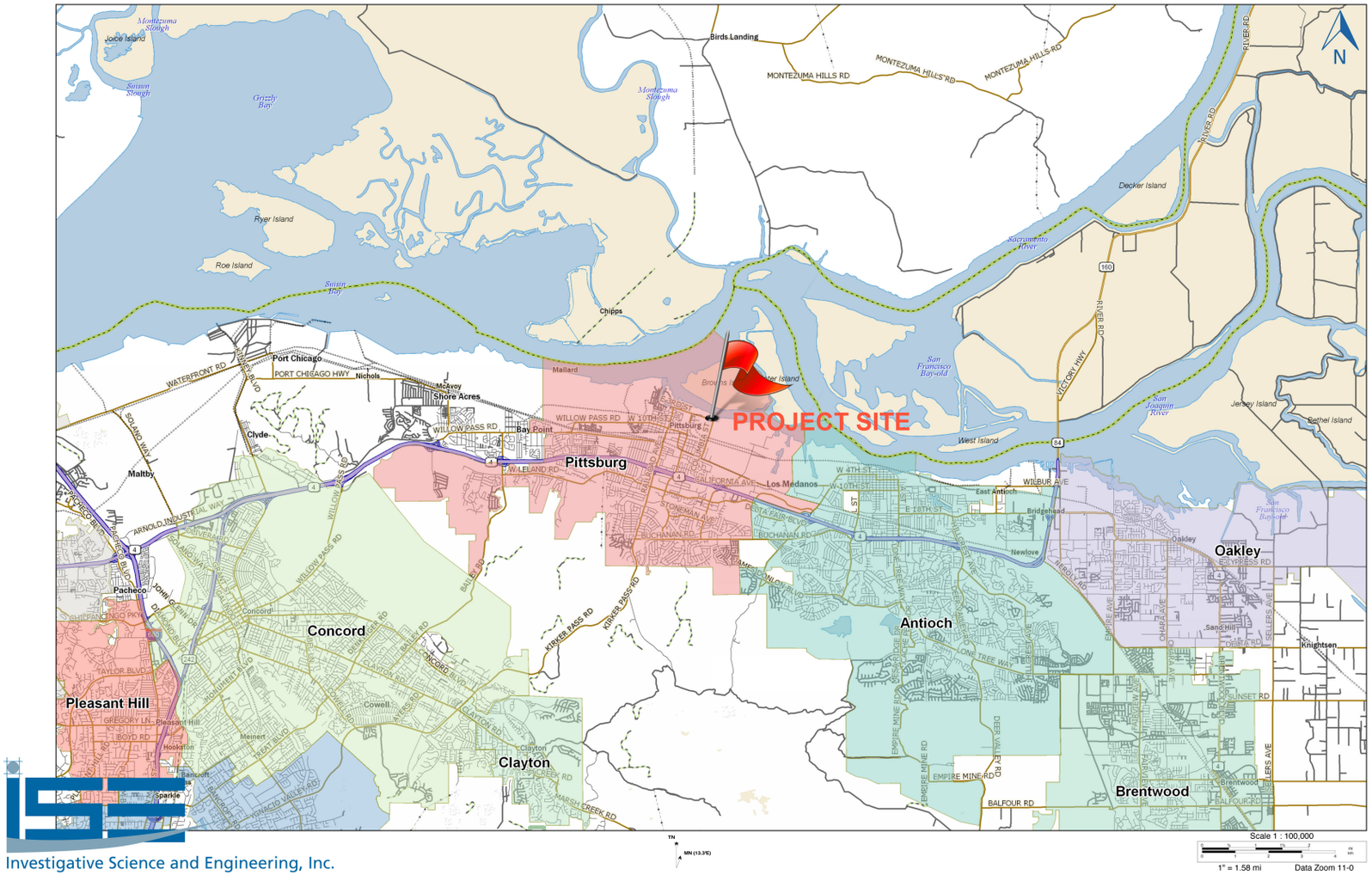
[1] Per the Federal Clean Air Act of 1970 (United States Code, Title 42, Chapter 85) and subsequent amendments.

[2] The recent CEQA case law is *Sierra Club v. County of Fresno* (5th Dist. 2014) 226 Cal.App.4th 704.



Investigative Science and Engineering, Inc.

FIGURE 1: Project Study Area Vicinity Map (ISE 5/19)

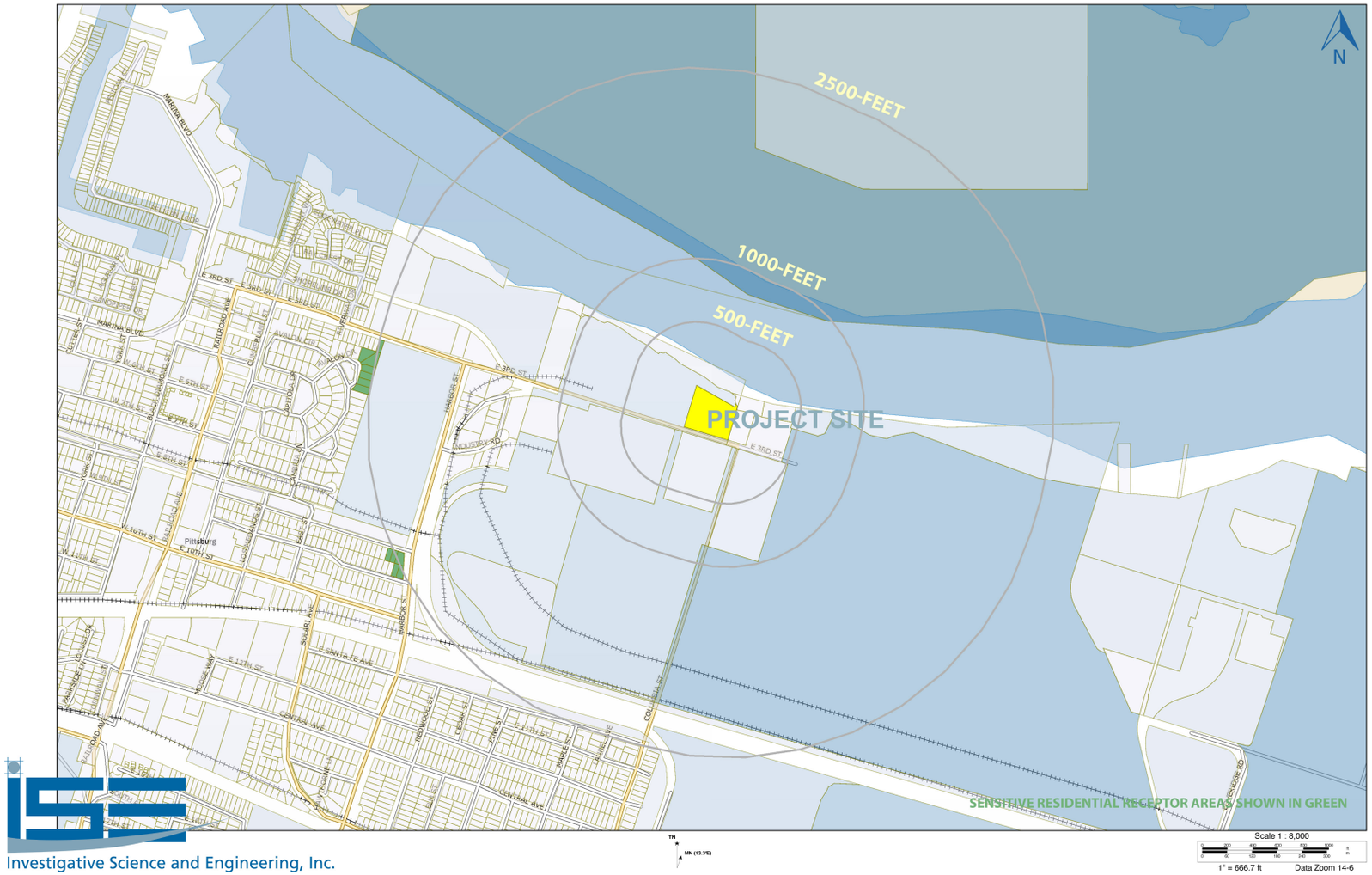


FIGURE 2: Project Study Area Parcel Map Showing Nearby Sensitive Receptors (ISE 5/19)

FIGURE 3: Aerial Image Showing Development Area and Surrounding Uses (ISE 5/19)

FIGURE 4: Proposed San Francisco Bay Aggregates Development Plan (AEPC Group LLC, 2/19)

TABLE 1: Examples of EPA Monitored Pollutants

Pollutant Name	Chemical Abbreviation	Physical Properties	Health Effects
Carbon Monoxide	CO	Carbon monoxide is a colorless, odorless, tasteless and toxic gas resulting from the incomplete combustion of fossil fuels. CO is a criteria air pollutant.	CO interferes with the blood's ability to carry oxygen to the body's tissues and results in numerous adverse health effects including permanent heart or brain damage.
Oxides of Sulfur	SO_x	Typically strong smelling, colorless gases that are formed by the combustion of fossil fuels. SO_2 and other sulfur oxides contribute to the problem of acid deposition. SO_2 is a criteria pollutant.	Exposure to high levels of oxides of sulfur can result acute health effects such as irritation of upper respiratory tract, increased asthma symptoms, and aggravation of heart disease, and chronic health effects including bronchitis and emphysema.
Nitrogen Oxides	NO_x	Nitrogen oxides consist of nitric oxide (NO), nitrogen dioxide (NO_2), and nitrous oxide (N_2O); these are formed when nitrogen (N_2) combines with oxygen (O_2). Life spans for these gasses range from one to seven days for nitric oxide and nitrogen dioxide, and 170 years for nitrous oxide. Nitrogen oxides are typically created during combustion processes, and are major contributors to smog formation and acid deposition. These compounds absorb blue light, resulting in a brownish-red cast to the atmosphere reducing visibility. NO_2 is a criteria air pollutant.	Exposure to oxides of nitrogen can result in acute health effects such as coughing, difficulty breathing, vomiting, headache, or chemical pneumonitis or pulmonary edema, and chronic health effects such as bronchitis, emphysema, and decreased lung function.
Ozone	O_3	A strong smelling, pale blue, reactive toxic chemical gas consisting of three oxygen atoms. It is a product of the photochemical process involving the sun's energy. Ozone exists in the upper atmosphere ozone layer, as well as at the earth's surface. Ozone is a criteria air pollutant and is a major component of smog.	Exposure to ozone can result in acute health effects including increased respiration and pulmonary resistance, cough, pain, shortness of breath, and lung inflammation, and chronic health effects such as permeability of respiratory epithelia, and possible permanent lung impairment.

TABLE 1 (cont.): Examples of EPA Monitored Pollutants

Pollutant Name	Chemical Abbreviation	Physical Properties	Health Effects
Particulate Matter less than 10 microns	PM_{10}	A major air pollutant consisting of tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. PM_{10} causes visibility reduction and is a criteria air pollutant.	The size of the particles allows them to easily enter the lungs, where they may be deposited, resulting in adverse health effects. Exposure to respirable particulate matter can result in acute health effects such as aggravation of existing respiratory and cardiovascular needs, and chronic health effects such as alterations to the immune system or carcinogenesis.
Particulate Matter less than 2.5 microns	$PM_{2.5}$	A similar air pollutant consisting of tiny solid or liquid particles which are 2.5 microns or smaller (often referred to as fine particles). These particles are formed in the atmosphere from primary gaseous emissions that include sulfates formed from SO_2 release from power plants and industrial facilities, and nitrates that are formed from NO_x release from power plants, automobiles and other types of combustion sources. The chemical composition of fine particles highly depends on location, time of year, and weather conditions.	Exposure to fine particulate matter can result in acute health effects such as aggravation of existing respiratory and cardiovascular needs, and chronic health effects such as alterations to the immune system or carcinogenesis.
Volatile Organic Compounds	VOC's	Volatile organic compounds are hydrocarbon compounds that exist in the ambient air. VOC's contribute to the formation of smog through atmospheric photochemical reactions and/or may be toxic. VOC's often have an odor, and some examples include gasoline, alcohol, and the solvents used in paints.	Health effects may include eye, nose and throat irritation, headaches, loss of coordination and nausea, damage to liver, kidney and central nervous system. Some organics can cause cancer in animals, and some are suspected or known to cause cancer in humans.

TABLE 1 (cont.): Examples of EPA Monitored Pollutants

Pollutant Name	Chemical Abbreviation	Physical Properties	Health Effects
Reactive Organic Gasses	ROG's	Reactive Organic Gasses are also precursors in forming ozone, and consist of compounds containing methane, ethane, propane, butane, and longer chain hydrocarbons that are typically the result of some type of combustion/decomposition process. Smog is formed when ROG and nitrogen oxides react in the presence of sunlight.	Health effects similar to that of VOC's
Hydrogen Sulfide	H_2S	A colorless, flammable, poisonous compound having a characteristic rotten-egg odor. It often results when bacteria break down organic matter in the absence of oxygen.	High concentrations of 500-800 ppm can be fatal and lower levels cause eye irritation and other respiratory effects.
Sulfates	SLS or SLES	An inorganic ion that is generally naturally occurring and is one of several classifications of minerals containing positive sulfur ions bonded to negative oxygen ions. Sulfate is a salt that forms when sulfuric acid reacts with another chemical.	Sulfates can irritate eyes, skin, and lungs, especially with long-term use; however, sulfates are also used extensively in the medical industry.
Lead	Pb	A malleable, metallic element of bluish-white appearance that readily oxidizes to a grayish color. Lead is a toxic substance that can cause damage to the nervous system or blood cells. The use of lead in gasoline, paints, and plumbing compounds has been strictly regulated or eliminated, such that today it poses a very small risk.	Exposure to lead can result in acute health effects such as reproductive/developmental effects (fetus and children) and numerous chronic health effects such as neurological, endocrine, and cardiovascular effects. Exposure to high levels of lead may cause anemia, weakness, and kidney and brain damage. Very high lead exposure can cause death.
Visibility Reducing Particles	VRP's	Visibility Reducing Particles are just what the name implies, namely, small particles that occlude visibility and/or increase glare or haziness. Since sulfate emissions (notably SO_2) have been found to be a significant contributor to visibility-reducing particles, Congress mandated reductions in annual emissions of SO_2 from fossil fuels starting in 1995.	Not applicable.

Collectively, these standards are called the National Ambient Air Quality Standards (NAAQS).[3] The California Air Resources Board (CARB) subsequently established a typically more stringent set of standards called the California Ambient Air Quality Standards (CAAQS).[4] Both sets of standards are shown in Figure 5 on the following page. Areas in California where ambient air concentrations of pollutants are higher than the state standard are considered to be in *"non-attainment"* status for that pollutant.

ENVIRONMENTAL SIGNIFICANCE THRESHOLDS

California Environmental Quality Act (CEQA) Thresholds

Section 15382 of the California Environmental Quality Act (CEQA) guidelines defines a significant impact as, *"… a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."* The minimum change in ambient air quality conditions within Contra Costa County, and the City of Pittsburg, as identified by the Bay Area Air Quality Management District (BAAQMD), are outlined starting on Page 11 of this report.

CEQA Air Quality Screening Standards

The City of Pittsburg uses Appendix G.III of the State CEQA guidelines as thresholds of significance, and recognizes the BAAQMD's established screening thresholds for air quality emissions as screening standards. These screening standards will be applied throughout this air quality conformity assessment for the basis of determination of both regional, as well as localized, air quality impacts due to the proposed project. The standards used by the City focus on the following potential impact areas; namely, would the project:

- Conflict with or obstruct implementation of the applicable air quality plan?
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation?
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is in non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?
- Expose sensitive receptors to substantial pollutant concentrations?
- Create objectionable odors affecting a substantial number of people?

[3] Under the Federal Clean Air Act of 1970, U.S.C. Title 42, Chapter 85, as amended in 1977 and 1990.

[4] The new CARB eight-hour ozone standard became effective in 2006. The new federal $PM_{2.5}$ standard became effective in 2007.

Pollutant	Averaging Time	California Standards		National Standards		
		Concentration	Method	Primary	Secondary	Method
Ozone (O_3)	1 Hour	0.09 ppm (180 µg/m^3)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m^3)		0.070 ppm (137 µg/m^3)		
Respirable Particulate Matter (PM10)	24 Hour	50 µg/m^3	Gravimetric or Beta Attenuation	150 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m^3		—		
Fine Particulate Matter (PM2.5)	24 Hour	—	—	35 µg/m^3	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m^3	Gravimetric or Beta Attenuation	12.0 µg/m^3	15 µg/m^3	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m^3)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m^3)		9 ppm (10 mg/m^3)	—	
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	
Nitrogen Dioxide (NO_2)	1 Hour	0.18 ppm (339 µg/m^3)	Gas Phase Chemiluminescence	100 ppb (188 µg/m^3)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m^3)		0.053 ppm (100 µg/m^3)	Same as Primary Standard	
Sulfur Dioxide (SO_2)	1 Hour	0.25 ppm (655 µg/m^3)	Ultraviolet Fluorescence	75 ppb (196 µg/m^3)	—	Ultraviolet Flourescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m^3)	
	24 Hour	0.04 ppm (105 µg/m^3)		0.14 ppm (for certain areas)	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)	—	
Lead	30 Day Average	1.5 µg/m^3	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m^3 (for certain areas)	Same as Primary Standard	
	Rolling 3-Month Average	—		0.15 µg/m^3		
Visibility Reducing Particles	8 Hour	—	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m^3	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m^3)	Ultraviolet Fluorescence			
Vinyl Chloride	24 Hour	0.01 ppm (26 µg/m^3)	Gas Chromatography			

FIGURE 5: Ambient Air Quality Standards Matrix (CARB/EPA, 5/4/16)

BAAQMD Criteria Pollutant Standards

Pursuant to the California Health & Safety Code, jurisdiction for regulation of air emissions from non-mobile sources within Contra Costa County has been delegated to the Bay Area Air Quality Management District (BAAQMD).[5] As part of its air quality permitting process, BAAQMD has established thresholds for the preparation of *Air Quality Impact Assessments* (AQIA's) and/or *Air Quality Conformity Assessments* (AQCA's). For projects whose stationary-source emissions are below these criteria, no AQIA is typically required, and project level emissions are presumed to be less than significant. The applicable standards are shown in Table 2 below.

TABLE 2: Thresholds of Significance for Air Quality Impacts

Pollutant	Thresholds of Significance (Pounds per Day)	Clean Air Act Significance Levels (Tons per Year)
Carbon Monoxide (CO)	*See Note 1*	100
Oxides of Nitrogen (NO_x)	54	50
Particulate Matter (PM_{10})	82	100
Particulate Matter ($PM_{2.5}$)	54	100
Reactive Organic Gasses (ROG's)	54	50
Oxides of Sulfur (SO_x)	*See Note 2*	100
Volatile Organic Compounds (VOC's)	*See Note 2*	50

Notes:

1. Operational CO levels based on measured or predicted concentrations equal to 9.0 ppm (8-hour average), 20.0 ppm (1-hour average). There is no construction-related threshold.
2. The District has no standard for this pollutant.

Source: BAAQMD CEQA Air Quality Guidelines, 5/17.

The City of Pittsburg accepts the use of these numerical "screening criteria" as *"Thresholds of Significance"* by projects for the purposes of CEQA analysis. In the event that project emissions may approach or exceed these screening level criteria, modeling would be required to demonstrate that the project's ground-level concentrations, including appropriate background levels, are below the Federal and State Ambient Air Quality Standards. If emissions exceed the allowable thresholds, additional analysis is conducted to determine whether the emissions would exceed an ambient air quality standard (i.e., the CAAQS values previously shown in Figure 5).

[5] Source: California Health & Safety Code, Division 26, Part 3, Chapter 1, Section §40002.

Determination of significance considers both localized impacts (such as CO hotspots) and cumulative impacts. In the event that any criteria pollutant exceeds the threshold levels, the proposed action's impact on air quality is considered significant and mitigation measures would be required. For CEQA purposes, these screening criteria are used as numeric methods to demonstrate that a project's total emissions (e.g. stationary and fugitive emissions, as well as emissions from mobile sources) would not result in a significant impact to air quality. No differentiation is made between construction and operational emission thresholds with the exception of the aforementioned concentration threshold for CO.

Finally, under the General Conformity Rule, the EPA has developed a set of *de minimis* thresholds for all proposed federal actions in a non-attainment area for evaluating the significance of air quality impacts. It should be noted that the State (i.e., BAAQMD) standards are equal to, or more stringent than, the Federal Clean Air standards. Development of the proposed project would therefore fall under the stricter BAAQMD guidelines.

Combustion Toxics Risk Factors

When fuel burns in an engine, the resulting exhaust is made up of gases representing hundreds of different chemical substances. The predominant constituents are nitrous oxide, nitrogen dioxide, formaldehyde, benzene, sulfur dioxide, hydrogen sulfide, carbon dioxide, and carbon monoxide. Over ninety-percent (90%) of the exhaust emissions from an engine consist of particles whose size is equal to, or less than, 10-microns in diameter. Particles of this size can easily be inhaled and deposited in the lungs. Diesel exhaust contains roughly 20 to 100 times more emissive particles than gasoline exhaust. Of principal concern are particles of cancer causing substances known as *polynuclear aromatic hydrocarbons* (PAH's).[6]

There are inherent uncertainties in risk assessment with regard to the identification of compounds as causing cancer or other adverse health effects in humans, the cancer potencies and Reference Exposure Levels (REL's) of compounds, and the exposure that individuals receive.[7] It is common practice to use conservative (health protective) assumptions with respect to uncertain parameters. The uncertainties and conservative assumptions must be considered when evaluating the results of risk assessments.

[6] Polynuclear aromatic hydrocarbons (PAH's) are hydrocarbon compounds with multiple benzene rings. PAH's are a group of approximately 10,000 compounds which result predominately from the incomplete burning of carbon-containing materials like oil, wood, garbage or coal.

[7] The exposure level at which there are no biologically significant increases in the frequency or severity of adverse effects between the exposed population and the control group. Some effects may be produced at this level, but they are not considered adverse or precursors to adverse effects.

Estimates of potencies and REL's are derived from experimental studies, or from epidemiological studies of exposed workers or other populations.[8] Uncertainty arises from the application of potency, or REL values derived from this data, to the general population. Thus using the CARB threshold, a risk concentration level of one in one million (1:1,000,000) of continuous 70-year exposure is considered less than significant. A risk exposure level of ten in one million (10:1,000,000) is acceptable if *Toxic Best Available Control Technologies* (T-BACT's) are used.[9] This approach has the advantage of not needing to quantify the population of the statistical group adjacent to the construction (which could yield false values), as well as allowing the per-person risk to be expressed as a final percentage (with a percentage level of 100% being equal to the impact threshold). Of course, for a large enough population sample (i.e., a million people or more) the results are identical to CARB's prediction methodology.

For purposes of analysis under this report, and to be consistent with the approaches used for other toxic pollutants, a functional comparison of the aforementioned risk probability per individual person exposed to construction contaminant particles (i.e., PM_{10}) will be examined. Additionally, a Tier 1 assessment of construction generated Volatile Organic Compounds (VOC's) and/or Reactive Organic Gasses (ROG's), in accordance with the guidelines established by the Office of Environmental Health Hazard Assessment (OEHHA), was performed for the aggregate of onsite and offsite activities.

APPROACH AND METHODOLOGY

The analysis criteria for air quality impacts in this report are based upon the analytical methods developed by the California Air Resources Board (CARB) as compiled in the SCAQMD CEQA Handbook, as well as impact screening guidance from the Bay Area Air Quality Management CEQA Guidelines.[10] These methods are a codification of the analysis protocols developed by CARB for use throughout the State of California. This analysis establishes aggregate emission calculations for determining the potential significance of a proposed action. In the event that the emissions exceed the established thresholds, air dispersion modeling may be conducted to assess whether the proposed action results in an exceedance of an air quality standard. The City of Pittsburg has accepted this methodology.

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[8] Source: *CalEPA, USEPA, SCAQMD, 2001 et. seq.*

[9] For many compounds it is uncertain whether the health effects observed at higher exposure levels in the laboratory or in occupational settings will occur at lower environmental exposure levels. In order to ensure that potential health impacts are not underestimated, it is commonly assumed that effects seen in animals, or at high exposure levels, could potentially occur in humans following low-level environmental exposure.

[10] The *South Coast Air Quality Management District (SCAQMD) CEQA Handbook* is a compilation reference containing an extensive list of semi-empirical equations and modeling scenarios developed by CARB describing various emissive sources having important context under CEQA. The equations are not perfect (in that they would not constitute an *'exact solution'* in a scientific sense), but are nonetheless a reasonable approximation of the physical problem. In the same light, programs which utilize the SCAQMD semi-empirical methodology (such as *CalEEMod model and its predecessor URBEMIS*) provide no greater problem understanding than using the equations directly. Such programs are still subject to all of the same limitations as the methods and equations on which they rely.

Ambient Air Quality Data Collection

CARB Air Monitoring Station Data within Project Vicinity

The California Air Resources Board (CARB) monitors ambient air quality at approximately 250 air-monitoring stations across the state. Air quality monitoring stations typically measure pollutant concentrations 10 feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. BAAQMD operates a network of over 30 ambient air-monitoring stations within the district.

The ambient air-quality-monitoring station (denoted by the symbol in Figure 6 on Page 15 of this report), which is in relative close proximity to the project site, and would be representative of ambient air toxics under both onshore and offshore atmospheric wind conditions, is located within the City of Concord approximately 10.5 miles from the project site.[11] Other stations within the project vicinity present either incomplete or redundant data, or were determined to be offline during the writing of this AQIA.[12] Finally, due to the type of equipment deployed at each station, not every station is capable of recording the entire set of criteria pollutants previously identified in Table 2. Periodic audits are conducted of each station to ensure calibration conformance.[13]

Construction and Material Handling Air Quality Modeling

Vehicle Emission Modeling (CO, NO_x, SO_x, PM_{10}, $PM_{2.5}$, ROG)

Due to the unique nature of this project as a pilot process plant, construction vehicle pollutant emission generators would be present during both the minimal construction phase of the project, as well as during the operational test phase, where said equipment would be repurposed for onsite material haulage and movement, and reincorporated back into the operational emissions analysis as well. The analysis methodology for this equipment is based upon the EPA AP-42 tiered emissions report for the various classes of diesel construction equipment.[14,15]

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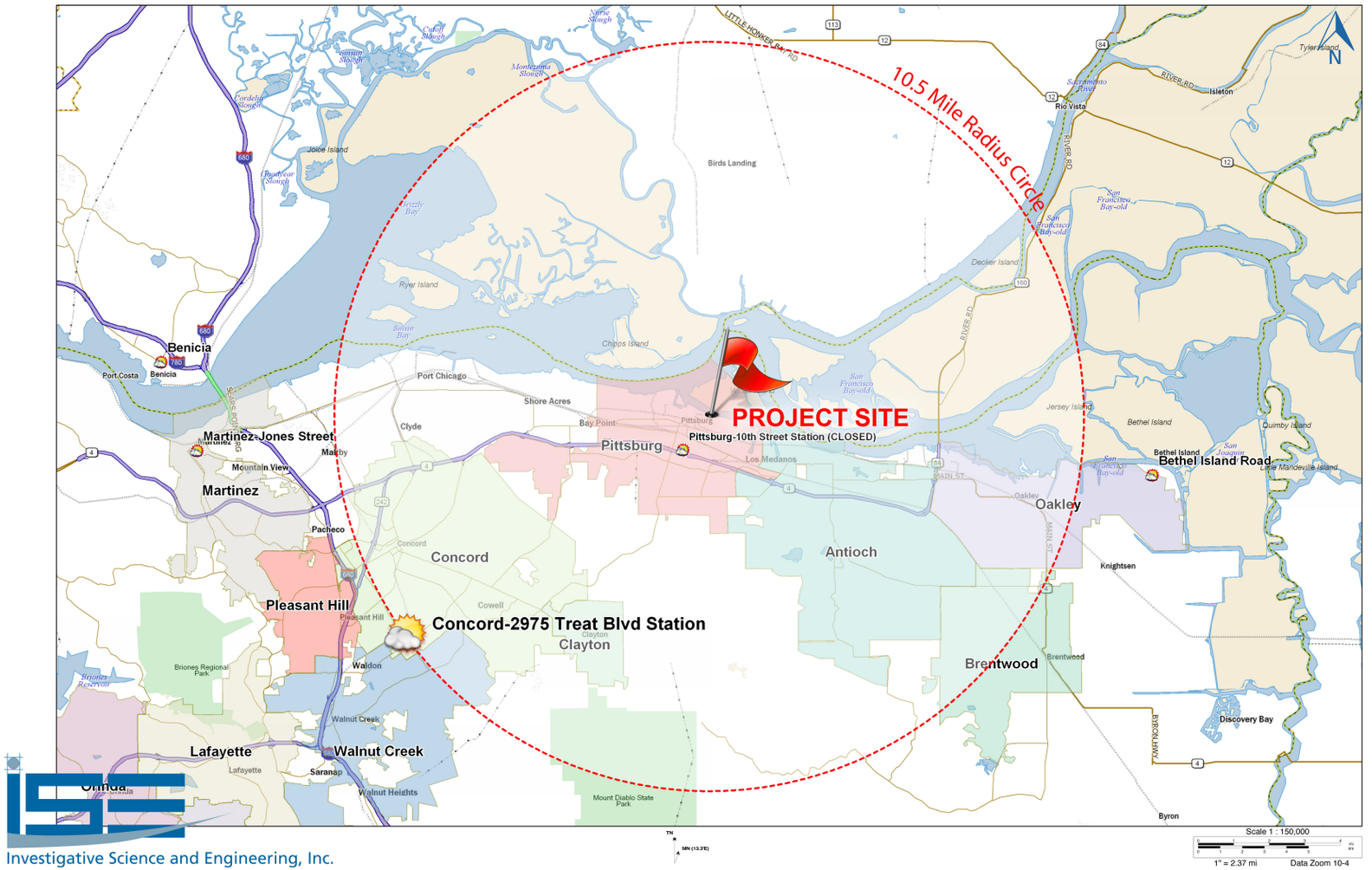
[11] Concord Treat Blvd. Station (2956-A Treat Blvd., Concord CA 94518) – ARB Station ID 07448. This station currently measures: O_3, CO, NO_2, SO_2, PM_{10}, $BAMPM_{2.5}$, Toxics, Outdoor Temperature, Relative Humidity, Wind Direction, Wind Direction Wind Speed, and Wind Speed.

[12] The closest physical station to the project site is actually located in the City of Pittsburg (10^{th} Street Station) approximately a mile from the site. Unfortunately, data from this station is not available as it is currently closed and non-operational.

[13] Calibration of CARB equipment is performed in accordance with the *U.S. Environmental Protection Agency's 40 CFR, Part 58, Appendix A* protocol with all equipment traceable to National Institute of Standards and Technology (NIST) standards. The typical accuracy of the equipment is ±15% for gasses (such as CO, NO_x, etc.) and ±10% for PM_{10}.

[14] The EPA allowable maximum CO emissions from Tier 2 equipment is 0.0082 pounds per horsepower-hour (lb/HP-hr) for equipment with power ratings between 50 and 175 HP, and 0.0057 lb/HP-hr for equipment with power ratings over 175 HP. Tier 3 ratings only apply between 50 and 750 HP and are identical to Tier 2 requirements. Tier 4 requirements (which were phased-in between 2008 and 2015) set a sliding scale on CO limits ranging from 0.0132 lb/HP-hr for small engines, to 0.0057 lb/HP-hr for engines up to 750 HP.

[15] The EPA allowable maximum NO_x and PM_{10} emissions from Tier 2 equipment are 0.0152 and 0.0003 lb/HP-hr regardless of the engine size. Tier 3 emissions must meet the Tier 2 requirement. Tier 4 standards further reduce this level to 0.0006 lb/HP-hr for NO_x, and 0.00003 lb/HP-hr for PM_{10} for engines over 75 HP.



Investigative Science and Engineering, Inc.

FIGURE 6: Ambient Air Quality Monitoring Station Location Map (ISE 5/19)

The maximum generation rates of typical equipment would constitute the baseline (unmitigated) emission rates as mandated by the EPA. Estimates of daily load factors (i.e., the amount of time during a day that any piece of equipment is under load and/or operational) were based upon past ISE engineering experience with similar operations, and consultation with the project applicant.[16,17]

In cases where the required construction equipment aggregate does not comply with the applicable standards for a pollutant under examination, mitigation is imposed by requiring cleaner (i.e., higher tiered) equipment, as required under the Federal Clean Air Act.[18,19] The proposed project was assumed to utilize Tier 3 engines as a baseline project feature.

Finally, fine particulate dust generation ($PM_{2.5}$) from construction equipment was analyzed using the methodology identified by the SCAQMD.[20] This approach, which utilizes the *California Emission Inventory Development and Reporting System* (CEIDARS) database, estimates $PM_{2.5}$ emissions as a fractional percentage of the aggregate PM_{10} emissions. For diesel construction equipment, the fractional emission factor is 0.920 $PM_{2.5}$ / PM_{10}.

Fugitive Dust Emission Modeling (PM_{10}, $PM_{2.5}$)

Fugitive dust generation from the proposed minimal site construction and outdoor material movement during the operational phase was analyzed using the methodology recommended by CARB for calculating 10-micron Particulate Matter (PM_{10}) due to earthwork movement and stockpiling. The analysis assumed low-wind speeds and active wet suppression control. Aggregate levels of PM_{10}, based upon the best available surface grading estimates, were calculated in pounds per day and compared to the applicable significance criteria previously shown in Table 2.

For surface grading operations, the fractional emission factor is 0.208 $PM_{2.5}$ / PM_{10} based upon the SCAQMD approach. For unpaved road travel, the fractional emission factor is 0.212 $PM_{2.5}$ / PM_{10}.

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[16] This is consistent with expected plan-to-ground conditions during construction for a reasonably foreseeable level of impact per Title 14, Section 15126 et. seq.

[17] Duty cycles are based upon client estimates of equipment utilization based on previous projects of this type. Powered haulage does not operate onsite in a continuous manner at full throttle. Additionally, CARB prohibits diesel equipment from idling more than five (5) minutes per 13 CCR § 2485. Therefore, equipment operators are required to turn off their engines if they are expected to be inactive for more than five minutes.

[18] Source: US Code of Federal Regulations, Title 40, Part 89 [40 CFR Part 89].

[19] In most cases the federal regulations for diesel construction equipment also apply in California, whose authority to set emission standards for new diesel engines is limited. The federal Clean Air Act Amendments of 1990 (CAA) preempt California's authority to control emissions from both new farm and construction equipment under 175 hp [CAA Section 209(e)(1)(A)] and require California to receive authorization from the federal EPA for controls over other off-road sources [CAA Section 209 (e)(2)(A)].

[20] The $PM_{2.5}$ emission factors are based upon the SCAQMD document, "Final – Methodology to Calculate Particulate Matter (PM) 2.5 and PM 2.5 Significance Thresholds", 10/06. The correction factor for diesel equipment of this type is 0.920.

Health-Risk Emission Modeling (PM_{10}, $PM_{2.5}$)

For the purposes of this analysis, worst-case construction vehicle (i.e., diesel haulage and movement equipment) pollutant emission generators would consist entirely of minimal construction activities associated with initial site preparation as well as operational utilization during the pilot test phase consisting of material haulage, placement, and storage. The analysis methodology utilized in this report is based upon EPA and CARB guidelines for general construction operations.

Construction emissions were based upon worst-case Tier 3 generation rates for the various classes of diesel construction equipment per consultation with the project applicant. A screening risk assessment of diesel-fired toxics from construction equipment was performed using the *SCREEN3* dispersion model developed by the *EPA's Office of Air Quality Planning and Standards*.[21] The SCREEN3 model uses a Gaussian plume dispersion algorithm that incorporates source-related and meteorological factors to estimate pollutant concentration from continuous sources.[22]

Using the concentrations obtained from the screening model, the diesel toxic risk can be defined as shown below:

$$Risk = \frac{F_{wind} \cdot EMFAC \cdot URF_{70}}{Dilution}$$

Where the following variables are defined:

Risk = The excess cancer risk (probability in one-million),

F_{wind} = The frequency of the wind blowing from the exhaust source to the receptor (the default value is 1.0),

EMFAC = The exhaust particulate emission factor (the level from the screening model),

URF_{70} = The Air Resource Board unit risk probability factor (300 x 10^{-6}, or 300 in a million cancer risk per $\mu g/m^3$ of diesel combustion generated PM_{10} inhaled in a 70-year lifetime,[23] and,

Dilution = The atmospheric dilution ratio during source-to-receptor transport (the default value of 1.0 assumes no dilution).

[21] The methodology is based upon the *Industrial Source Complex (ISC3)* source dispersion approach as outlined in the *EPA-454/B-95-003b* technical document. The SCREEN3 model is used within the State of California and is typically more restrictive than the ISC3 model.

[22] Modeling under SCREEN3 assumes that the pollutant in question does not undergo any chemical reactions, and that no other removal processes, such as wet or dry deposition, act on the plume during its transport from the source.

[23] Based upon the ARB 1999 Scientific Review Panel staff report on diesel toxic emissions.

Given the above assumptions for wind frequency and atmospheric dilution ratio, and substituting the CARB recommended value for the unit risk probability factor, gives the following expression:

$$Risk = \frac{\cancel{1.0} \cdot EMFAC \cdot 300x10^{-6}}{\cancel{1.0}} = 300x10^{-6} \cdot EMFAC \text{ per person}$$

Thus, the percentage of risk of cancer to any given person, being exposed to a concentration of pollution equal to EMFAC (in μg/m^3) over a continuous period of 70-years[24], would be:

$$Risk_{\%} = \left(300x10^{-6} \cdot EMFAC\right) \cdot 100 = 300x10^{-4} \cdot EMFAC \text{ per person}$$

For the construction-related diesel-fired toxics analysis, an area-source consistent in dimensions with the proposed grading area will be assumed. A simplified elevated terrain model (which is consistent with the area surrounding the project site) with no building downwash corrections and a worst-case wind direction was utilized.

VOC Emissions and Associated Health Risks

Additionally, an air toxics hotspot assessment of construction generated Volatile Organic Compounds (VOC's) and/or Reactive Organic Gasses (ROG's) in accordance with the guidelines established by the Office of Environmental Health Hazard Assessment (OEHHA) was performed for the aggregate of onsite and offsite activities.[25,26]

OEHHA defines the excess cancer risk due to inhaled organic compounds as a function of duration and age sensitivity as,

$$Risk_{inh-res} = DOSE_{air} \cdot CPF \cdot ASF \cdot \frac{ED}{AT} \cdot FAH$$

[24] Where it can be directly stated that a risk percentage of, say, 25% would indicate a 25% probability of inhaled cancer risk for the given level of exposure if consumed continuously for a period of 70-years. A 50% probability would correspond to a 50:50 chance of inhaled cancer risk if consumed continuously for a period of 70-years, and so on.

[25] Source: The Air Toxics Hot Spots Program Guidance Manual for Preparation of Health Risk Assessments, Office of Environmental Health Hazard Assessment (OEHHA), 2/15.

[26] Most of the toxicants assessed under the Hot Spots program are volatile organic compounds that remain as gases when emitted into the air. These chemicals are not subject to appreciable deposition to soil, surface waters, or plants. Therefore, human exposure via ingestion or dermal exposure, at least at concentrations typically encountered in the ambient air, is not considered for volatile organic compounds in the Hot Spots risk assessments.

Where the following variables are defined:

$Risk_{inh\text{-}res}$ = The residential inhalation cancer risk,

$DOSE_{air}$ = The daily inhalation dose (mg/kg/day),

CPF = The Inhalation Cancer Potency Factor (mg/kg-day^{-1})

ASF = The Age Sensitivity Factor for a specified age group (unitless),

ED = The Exposure Duration (in years) for a specified age group,

AT = The Averaging Time for lifetime cancer risk (years), and,

FAH = The fraction of time spent at home (unitless).

For the types of activities under examination for this project, OEHHA recommends a Point Assessment Approach, which documents average (mean) and high-end values for key exposure pathways (e.g., breathing rate for the inhalation exposure pathway). The mean represents the average values for point estimates, and the 95th percentiles represent the high-end point estimates from the source. Thus, within the limitations of the data, average and high-end point estimates are supported by the distribution, and would be considered a worst-case analysis under CEQA.

Aggregate Vehicle Emission Air Quality Modeling

Motor vehicle emissions associated with proposed SFBA project site were calculated by multiplying the appropriate emission factor (in grams per mile) times the estimated average trip length, and the total number of vehicles. CARB estimates on-road motor vehicle emissions by using a series of models called the *Motor Vehicle Emission Inventory* (MVEI) Models.

Four computer models, which form the MVEI, are *CALIMFAC, WEIGHT, EMFAC*, and *BURDEN*.[27] They function as follows:

- ***CALIMFAC*** produces base emission rates for each model year when a vehicle is new and as it accumulates mileage and the emission controls deteriorate.
- ***WEIGHT*** calculates the relative weighting each model year should be given in the total inventory, and each model year's accumulated mileage.
- ***EMFAC*** uses these pieces of information, along with the correction factors and other data, to produce fleet composite emission factors, and,
- ***BURDEN*** combines the emission factors with county-specific activity data to produce to emission inventories.

[27] The module named *EMFAC* should not be confused with the entire EMFAC program itself (which calls the subroutines *CALIMFAC, WEIGHT, EMFAC, and BURDEN* to determine the final emission inventory for a particular area).

For the current analysis, the *EMFAC 2017* of the MVEI was run using input conditions specific to the Contra Costa air basin to predict operational vehicle emissions from the project based upon a project completion/operational year 2020 scenario.[28,29] The aggregate emission factors from the EMFAC model are provided as an attachment at the end of this report. A mix ratio consistent with the *Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol* was used.[30]

Finally, fine particulate dust generation ($PM_{2.5}$) from motor vehicle operation was again analyzed using the aforementioned CEIDARS database. For operational vehicular traffic, the fractional emission factor is 0.998 $PM_{2.5}$ / PM_{10} based upon both the SCAQMD and EMFAC approaches.

Fixed Source Emissions Modeling

Fixed emission sources under the analysis context within this report would consist predominantly of those emissions identified by the project applicant as being generated as part of the pilot plant operation, and as identified and quantified under the applicant's Authority to Construct Application per BAAQMD Regulation 2, Rule 1 guidelines.[31]

Under the application document, the SFBA project is expected to produce low levels of CARB criteria pollutants, of differing levels, based upon one of two generation scenarios. Scenario 1 assumed that the SFBA plant would utilize the excess flue gas from a single turbine and heat recovery steam generator (HRSG) at the Calpine LMEC site as the source of CO_2 generation in the pilot process. Scenario 2 assumed that the SFBA site would utilize a registered 6.3 MBtu/hr natural gas boiler onsite to provide the necessary CO_2 generation.

Both scenarios are addressed in this AQIA, and for the purposes of a worst-case analysis, the maximum emissions from each case will be utilized for the purposes of impact assessment under the BAAQMD thresholds of significance.

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[28] This is the most current CARB emissions model approved for use within the State of California.

[29] This is a worst-case assumption, since implementation of cleaner vehicle controls ultimately reduces emissions under future year conditions. By applying near-term emission factors to the complete project, an upper bound on project-related emissions is obtained.

[30] This consisted of the following air standard Otto-Cycle engine vehicle distribution percentages: Light Duty Auto (LDA) = 69.0%, Light Duty Truck (LDT1) = 19.4%, Medium Duty Truck (LHD1) = 6.4%, Heavy Duty Truck Gasoline (MH GAS) = 1.2%, Heavy Duty Truck Diesel (MH DSL) = 3.6%, Motorcycle (MCY) = 0.4%.

[31] Source: *BAAQMD Authority to Construct Application, Regulation 2, Rule 1 Application Submittal Document, San Francisco Bay Aggregates,* Pittsburg CA, Prepared by Atmospheric Dynamics, Inc. 4/19.

CONFORMITY FINDINGS

Existing Climate Conditions

The climate within the region surrounding the proposed SFBA project site is characterized by warm, dry summers and mild, wet winters; it is dominated by a semi-permanent high-pressure cell located over the Pacific Ocean which generates seasonal cloud-cover variation over the course of the year. This high-pressure cell drives the dominant onshore circulation, as can be seen in Figure 9 on the following page, and helps to create two types of temperature inversions, subsidence and radiation, that contribute to local air quality degradation.[32]

In the area of the proposed project site, the maximum and minimum average temperatures are 90º F and 39º F, respectively.[33] Precipitation in the area averages approximately 16 inches annually, 90 percent of which falls between November and April. Fog can occasionally develop during the winter. The prevailing wind direction at the project site is from the west-southwest, with an annual mean speed of 3 to 5 miles per hour. Frequently, the strongest winds in the basin occur during the night and morning hours due to the absence of onshore sea breezes. The overall result is a noticeable degradation in local air quality.

Existing Air Quality Levels

CARB Aerometric Station Data within Project Vicinity

The project site is located in the eastern area of the San Francisco Bay Area Air Basin (SFBAAB). The Basin is in attainment for federal standards of CO, SO_2, and NO_2, and in nonattainment or unclassified status for O_3, PM_{10}, and $PM_{2.5}$.

Tables 3a through -c, starting on Page 23, provide a summary of the highest pollutant levels recorded at the previously identified monitoring station for the last year available (2017), based upon the latest data from the CARB Aerometric Data Analysis and Management (ADAM) System database.[34] Upon examination it can be seen that closest monitoring station reported slight air quality exceedances for the subject criteria pollutants O_3 and $PM_{2.5}$.[35]

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[32] Subsidence inversions occur during the warmer months, as descending air associated with the Pacific high-pressure cell meets cool marine air. The boundary between the two layers of air represents a temperature inversion that traps pollutants below it. Radiation inversion typically develops on winter nights, when air near the ground cools by radiation, and the air aloft remains warm. A shallow inversion layer that can trap pollutants is formed between the two layers.

[33] Source: *National Weather Service (NWS) / National Oceanographic and Atmospheric Administration (NOAA), 2019.*

[34] Averages for O_3 and CO are expressed in parts-per-million, NO_X is expressed in parts-per-billion, and particulate matter is shown in $\mu g/m^3$. CAAQS exceedances are denoted in yellow, while NAAQS exceedances are shown in orange.

[35] Monitoring for lead was discontinued entirely in 1998.

FIGURE 7: Project Air Basin Aerial Map (Google Earth 2019, ISE 5/19)

TABLE 3a: CARB Aerometric Data Analysis – Concord Treat Blvd Station (Panel 1)

Top 4 Summary: Highest 4 Daily Maximum 8-Hour Ozone Averages

at Concord-2975 Treat Blvd

	2015		2016		2017	
	Date	8-Hr Average	Date	8-Hr Average	Date	8-Hr Average
National 2015 Std (0.070 ppm):						
First High:	Sep 21	0.073	Sep 26	0.074	Sep 2	0.070
Second High:	Aug 16	0.072	Oct 9	0.071	Jun 22	0.069
Third High:	Sep 9	0.070	Apr 18	0.069	Sep 3	0.065
Fourth High:	Sep 20	0.070	Jun 3	0.065	Aug 26	0.064
National 2008 Std (0.075 ppm):						
First High:	Sep 21	0.073	Sep 26	0.074	Sep 2	0.070
Second High:	Aug 16	0.072	Oct 9	0.071	Jun 22	0.069
Third High:	Sep 9	0.070	Apr 18	0.069	Sep 3	0.065
Fourth High:	Sep 20	0.070	Jun 3	0.065	Aug 26	0.064
National 2015 Std (0.070 ppm):						
# Days Above the Standard:	2		2		0	
Nat'l Standard Design Value:	0.064		0.067		0.066	
National Year Coverage:	99		99		97	
National 2008 Std (0.075 ppm):						
# Days Above the Standard:	0		0		0	
Nat'l Standard Design Value:	0.064		0.067		0.066	
National Year Coverage:	99		98		96	

Highest Daily Maximum 8-Hour Ozone Averages

Top 4 Summary: Highest 4 Daily Maximum Hourly Ozone Measurements

at Concord-2975 Treat Blvd

	2015		2016		2017	
	Date	Measurement	Date	Measurement	Date	Measurement
First High:	Sep 21	0.088	Sep 26	0.095	Jun 22	0.082
Second High:	Sep 9	0.082	Oct 9	0.085	Sep 3	0.082
Third High:	Aug 16	0.081	Apr 18	0.083	Sep 2	0.081
Fourth High:	Jun 30	0.078	Sep 27	0.079	Oct 10	0.080
California:						
# Days Above the Standard:	0		1		0	
California Designation Value:	0.09		0.09		0.09	
Expected Peak Day Concentration:	0.086		0.089		0.087	
National:						
# Days Above the Standard:	*0*		*0*		*0*	
3-Year Estimated Expected Number of Exceedance Days:	*0.0*		*0.0*		*0.0*	
1-Year Estimated Expected Number of Exceedance Days:	*0.0*		*0.0*		*0.0*	
Nat'l Standard Design Value:	*0.087*		*0.088*		*0.083*	
Year Coverage:	99		99		98	

Highest Daily Maximum Hourly Ozone Measurements

Source: CARB ADAM Ambient Air Quality Inventory – 5/19

TABLE 3b: CARB Aerometric Data Analysis – Concord Treat Blvd Station (Panel 2)

Top 4 Summary: Highest 4 Daily 24-Hour PM2.5 Averages

at Concord-2975 Treat Blvd

	2015		2016		2017	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Jan 8	31.0	Dec 29	20.7	Oct 11	89.4
Second High:	Aug 16	30.4	Dec 13	19.4	Oct 12	62.6
Third High:	Jan 15	29.6	Jan 4	18.8	Oct 13	60.0
Fourth High:	Aug 15	29.1	Jan 12	18.7	Dec 15	39.5
California:						
First High:	Jan 8	31.0	Dec 29	20.7	Oct 11	89.4
Second High:	Aug 16	30.4	Dec 13	19.4	Oct 12	62.6
Third High:	Jan 15	29.6	Jan 4	18.8	Oct 13	60.0
Fourth High:	Aug 15	29.1	Jan 12	18.7	Dec 15	39.5
National:						
Estimated # Days > 24-Hour Std:		0.0		0.0		6.0
Measured # Days > 24-Hour Std:		0		0		6
24-Hour Standard Design Value:		23		22		26
24-Hour Standard 98th Percentile:		28.0		16.2		32.8
2006 Annual Std Design Value:		7.7		7.1		8.9
2013 Annual Std Design Value:		7.7		7.1		8.9
Annual Average:		8.8		5.9		12.0
California:						
Annual Std Designation Value:		8		7		12
Annual Average:		*		*		12.0
Year Coverage:		92		97		100

Highest Daily 24-Hour $PM_{2.5}$ Averages

Top 4 Summary: Highest 4 Daily 24-Hour PM10 Averages

at Concord-2975 Treat Blvd

	2015		2016		2017	
	Date	24-Hr Average	Date	24-Hr Average	Date	24-Hr Average
National:						
First High:	Jan 6	22.5	Jun 29	18.7	Sep 4	41.2
Second High:	Nov 14	21.9	Apr 6	18.6	Jan 31	29.9
Third High:	May 6	21.4	Sep 9	16.8	Aug 23	23.7
Fourth High:	Jun 23	19.8	Apr 30	15.8	Sep 16	21.7
California:						
First High:	Jan 6	24.0	Apr 6	19.0	Sep 4	41.0
Second High:	Nov 14	23.0	Jun 29	19.0	Jan 31	32.0
Third High:	May 6	22.0	Sep 9	17.0	Aug 23	24.0
Fourth High:	Jun 23	20.0	Apr 30	16.0	Sep 16	22.0
National:						
Estimated # Days > 24-Hour Std:		0.0		0.0		*
Measured # Days > 24-Hour Std:		0		0		0
3-Yr Avg Est # Days > 24-Hr Std:		0.0		0.0		*
Annual Average:		*6.7*		*6.2*		*6.5*
3-Year Average:		*7*		*7*		*6*
California:						
Estimated # Days > 24-Hour Std:		0.0		0.0		*
Measured # Days > 24-Hour Std:		0		0		0
Annual Average:		13.1		11.5		*
3-Year Maximum Annual Average:		14		14		13
Year Coverage:		8		9		8

Highest Daily 24-Hour PM_{10} Averages

Source: CARB ADAM Ambient Air Quality Inventory – 5/19

TABLE 3c: CARB Aerometric Data Analysis – Concord Treat Blvd Station (Panel 3)

Top 4 Summary: Highest 4 Daily Maximum Hourly Nitrogen Dioxide Measurements

at Concord-2975 Treat Blvd iADAM

	2015		2016		2017	
	Date	Measurement	Date	Measurement	Date	Measurement
National:						
First High:	Jan 5	33.0	Dec 19	33.6	Dec 8	40.6
Second High:	Nov 28	32.0	Dec 20	33.2	Dec 14	39.6
Third High:	Nov 13	31.7	Dec 18	32.6	Dec 6	38.9
Fourth High:	Nov 16	31.7	Dec 21	31.7	Dec 15	38.2
California:						
First High:	Jan 5	33	Dec 19	33	Dec 8	40
Second High:	Nov 28	32	Dec 20	33	Dec 14	39
Third High:	Jan 7	31	Dec 18	32	Dec 6	38
Fourth High:	Jan 26	31	Dec 2	31	Dec 15	38
National:						
1-Hour Standard Design Value:		36		33		31
1-Hour Standard 98th Percentile:		31.0		28.9		31.7
# Days Above the Standard:		0		0		0
Annual Standard Design Value:		7		6		7
California:						
1-Hour Std Designation Value:		40		40		40
Expected Peak Day Concentration:		44		42		37
# Days Above the Standard:		0		0		0
Annual Std Designation Value:		9		7		7
Annual Average:		7		6		6
Year Coverage:		93		99		97

Highest Daily Maximum Hourly Nitrogen Dioxide Averages

Source: CARB ADAM Ambient Air Quality Inventory – 5/19

Construction and Material Handling Emission Findings

The SFBA project is expected to have an operational lifetime of approximately 15 months commencing in the latter half of 2019. Construction and material handling operations, by and large, constitute the worst-case onsite pollutant-generating scenarios for the pilot program. Thus, the analysis presented is a worst-case analysis under CEQA. Given this, the following construction findings, as shown beginning on the next page, were indicated.

Vehicle Emissions (CO, NO_x, SO_x, PM_{10}, $PM_{2.5}$, ROG)

The estimated construction equipment diesel exhaust emission tabulations due to construction and material handling are provided in Table 4a on the following page. Additionally Table 4b provides an estimate of powered haulage emissions associated with material import for the pilot plant process as well as any haulage export of finished product, assumed to comprise a total of four (4) round trips at 110 miles each (i.e., 440 VMT) for a heavy duty diesel truck classification (MH DSL).

Based upon the findings, no significant diesel construction vehicle or powered haulage air quality impacts are expected.

Fugitive Dust Emission Levels (PM_{10}, $PM_{2.5}$)

Construction and material handling activities are also a source of fugitive dust emissions that may have a substantial, but temporary, impact on local air quality. Substantial dust emissions also occur when vehicles travel on paved and unpaved surfaces, and haul trucks lose material. Dust emissions and impacts due to the proposed grading vary substantially from day to day, depending on the level of activity, the specific operation being conducted, and the prevailing meteorological conditions.

Wet dust suppression techniques, such as watering and/or applying chemical stabilization, would be used during construction and operational material handling phases to suppress the fine dust particulates from leaving the ground surface and material stockpiles and becoming airborne through the action of mechanical disturbance or wind motion.

For the SFBA project, overall grading operations associated with either process equipment placement during the initial construction phase (estimated to be approximately 90 days, or 3 months), and material handling during the operational pilot phase (estimated at 360 days, or 12 months), are anticipated as being no greater than a worst-case 6,000 cubic-yards of material moved, or an approximate 20 cubic yards per average work day that the facility would be permitted to construct and operate.

TABLE 4a: Predicted Onsite Diesel Engine Emissions

Equipment Type Model	Selected EPA Tier Level	Quantity Used (#)	Engine Power Rating (HP)	Average Load Factor (%)	Duty Cycle (hrs/day)	Aggregate BAAQMD Criteria Pollutants (Pounds/Day)					
						CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	ROG
CAT 2PD5000 Forklift	3	1	51	50	8	1.7	3.1	0.4	0.1	0.1	0.4
JD 644E Loader	3	1	160	50	8	5.2	9.7	1.3	0.3	0.3	1.4
CAT CT610 Dump Truck	3	1	200	50	4	2.3	6.1	0.8	0.1	0.1	0.9
Peterbuilt 348 Transport Truck	3	1	280	50	4	3.2	8.5	1.1	0.2	0.2	1.2
Sum:		**4**				**12.4**	**27.4**	**3.6**	**0.8**	**0.7**	**4.0**
				BAAQMD Significance Threshold:		**- -**	**54**	**- -**	**82**	**54**	**54**

TABLE 4b: Powered Haulage Emissions due to Material Import for Processing

Powered Haulage	VMT	Criteria Pollutants Under Examination (in pounds per day)					
		CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	ROG
Heavy Duty Truck Haulage Totals (MH DSL):	**440**	**0.29**	**4.02**	**0.01**	**0.10**	**0.09**	**0.06**
BAAQMD Significance Threshold:		**- -**	**54**	**- -**	**82**	**54**	**54**

For fine aggregate material similar to what is proposed to be processed at the project site, the expected material movement would have the following total working weight.[36]

$$\text{Working Weight} = 6{,}000 \text{ cubic yards} \times \frac{1.3 \text{ tons}}{\text{cubic yard}} = 7{,}800 \text{ tons}$$

Out of the total quantity identified above, it is estimated that roughly 60-percent of the working weight would be capable of generating PM_{10}.[37] Given this, the working weight of earthwork material capable of generating some appreciable amount of PM_{10} would be 4,680 tons. Thus, the average material movement over the total 450 working days the pilot plant would be in operation would equate to 10.4 tons per day.

Following the analysis procedure identified in the *SCAQMD CEQA Handbook* for PM_{10} emissions from fugitive dust gives the following semi-empirical relationship for aggregate respirable dust generation in pounds.

$$PM_{10} = 0.00112 \cdot \left[\frac{\left(\frac{WS}{5} \right)^{1.3}}{\left(\frac{SMC}{2} \right)^{1.4}} \right] \cdot ET$$

Where the following variables are defined:

PM_{10} = Fugitive dust emissions in pounds,

WS = Ambient wind speed,

SMC = Surface Moisture Content, generally defined as the weight of the water (W_w) divided by the weight of the soil (W_s) as measured at the surface in grams per gram, and,

ET = Earthwork Tonnage moved per day.

Substituting a minimum SMC value of 0.25 (which is extremely conservative for an ambient material condition), and a maximum credible wind speed scenario of 12 MPH (WS = 12), gives the result seen at the top of the following page.

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[36] Standard Handbook for Civil Engineers, 4th Ed., McGraw-Hill, 1996.

[37] A working percentage of 60% is consistent with common engineering knowledge and field observations of worst-case PM_10 generation. Any scoop of unconsolidated, non-screened aggregate material will contain a certain percentage of rocks, cobbles, alluvium, etc., which cannot be broken down in the field to generate PM_{10}. Although 60% is probably high, it is consistent with a worst-case upper bound estimate for PM_{10} generation potential.

$$PM_{10} = 0.00112 \times \left[\frac{\left(\frac{12}{5}\right)^{1.3}}{\left(\frac{0.25}{2}\right)^{1.4}} \right] \times 10.4 = 0.7 \text{ Pounds}$$

or, a predicted level of 0.7 pounds of PM_{10} generated per day.[38] It should be noted that surface wetting will be utilized during all phases of earthwork operations at a minimum level of three times per day; thus a control efficiency of 34% to 68% reduction in fugitive dust can be applied per the CARB/SCAQMD methodology. Assuming a median 60% control efficiency, due to the aforementioned watering yields,

$$PM_{10} = (1 - 0.6) \cdot 0.7 = 0.3 \text{ Pounds}$$

or a total fugitive dust generated load of roughly 0.3 pounds per day. This level is far below the 82 pounds per day threshold established by the BAAQMD. Therefore, no impacts are expected from this phase of construction. The commensurate $PM_{2.5}$ level would be 0.1 pounds per day, which is also below the proposed threshold of significance of 54 pounds per day for this pollutant.

Additionally, following the analysis methods identified by CARB for PM_{10} emissions due to unpaved haul roads/surfaces gives the following semi-empirical relationship for aggregate respirable dust generation in pounds.

$$PM_{10} = VMT \times \left[2.1 \left(\frac{SLP}{12} \right) \left(\frac{MVS}{30} \right) \left(\frac{MVW}{3} \right)^{0.7} \left(\frac{NW}{4} \right)^{0.5} \left(\frac{365 - RD}{365} \right) \right]$$

Where the following variables are defined:

PM_{10} = Fugitive dust emissions in pounds due to haulage on unpaved roads,
VMT = Vehicle Miles Traveled per day,
SLP = Soil Silt Loading in Percent,
MVS = Mean Vehicle Speed in miles per hour,
MVW = Mean Vehicle Weight in tons,

[38] A wind speed (WS) of 12 MPH was chosen as the maximum speed before grading should stop prior to wind-generated disturbance. The soil moisture content (SMC) selected is a conservative value per CARB designed to produce a reasonably accurate PM_{10} estimate. Representative SMC values can be found in any textbook on geotechnical engineering, soil dynamics, CRC Handbook on Chemistry and Physics, or SCAQMD CEQA Handbook Table 9.9.G.1.

NW = Number of Wheels on the vehicle, and,

RD = Mean number of Rain Days with at least 0.01 inches of precipitation.

Unpaved road travel, or travel on unpaved surfaces, due to construction and operational activities is also unknown at this time. For the purposes of analysis, it will be assumed that contractors' vehicles moving onsite would traverse a total of five (5) miles per day (VMT) during the earthwork and site preparation phases.

Substituting the applicable project values of VMT = 5, SLP = 6.0 (sand/gravel road/surface with watering), MVS = 5 miles per hour, MVW = 20 tons (gross vehicular weight), NW = 10 wheels (average number of wheels), and RD[39] = 45.0 (rain days), gives the following result,

$$PM_{10} = 5.0 \times \left[2.1 \left(\frac{6}{12} \right) \left(\frac{5}{30} \right) \left(\frac{20}{3} \right)^{0.7} \left(\frac{10}{4} \right)^{0.5} \left(\frac{365 - 45}{365} \right) \right] = 4.6 \text{ Pounds}$$

or, a level of 4.6 pounds of PM_{10} generated per day. This activity would not generate a significant impact. The commensurate $PM_{2.5}$ level would be 1.0 pounds per day, which is also below the proposed threshold of significance identified above.

Combustion-Fired Health-Risk Emission Levels (CO, PM_{10}, $PM_{2.5}$)

Onsite diesel-fired equipment operation was assumed to occur over any given 24-hour period, thus providing an upper bound on expected emission concentrations, allowing direct comparison with the CAAQS standards. Although all stable criteria pollutants are provided, it should be noted that for cancer-risk potential, only combustion-fired PM_{10} particulates are considered, with $PM_{2.5}$ concentrations being determined through the aforementioned fractional emission estimates. Levels for CO concentrations are calculated for the purposes of determining compliance with BAAQMD CEQA thresholds of significance.

The proposed SFBA project site has a maximum working footprint of roughly 108,029 square-feet (10,036 m^2) based upon data obtained from the project site plans. The aggregate project emission rates for the various criteria pollutants, in grams per second, and grams per square-meter (m^2) per second, are shown in Table 5 on the following page.[40,41]

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[39] The selected vehicle miles traveled (VMT) are based on the anticipated motion of vehicle onsite. The mean vehicle speed (MVS) is selected as a maximum travel speed designed so as to not produce excessive dust plumes from the wheels. The mean vehicle weight (MVW) is the typical weight of a piece of powered haulage. The number of wheels (NW) corresponds to a three-axle vehicle with tandem wheels, and the number of rain days (RD) is from the National Weather Service.

[40] As a required input parameter for the SCREEN3 model.

[41] The averaging time for the input sources is shown at the bottom of Table 5 as 24 hours. The one-hour SCREEN3 concentration due to construction is the worst-case maximum concentration level from the site. Thus, the current analysis is consistent with a worst-case estimate under CEQA.

TABLE 5: Predicted Onsite Diesel-Fired Emission Rates

Criteria Pollutant	Max Daily Aggregate Emissions (pounds)	Daily Site Emission Rates (grams/second)	Average Area Emission Rates (grams/m^2/second)
CO	12.7	0.0666	6.6334E-06
NO_x	31.5	0.1652	1.6458E-05
SO_x	3.6	0.0190	1.8918E-06
PM_{10}	**0.9**	**0.0045**	**4.4946E-07**
$PM_{2.5}$	0.8	0.0042	4.1536E-07
ROG	4.0	0.0212	2.1105E-06

Total averaging time is 24 hours (86,400 seconds) per CAAQS standards. The area emission rates are shown in scientific notation. Values include contributions of all construction, powered haulage, and material handling activities.

The expected combustion-fired construction emission concentrations from the *SCREEN3* modeling are shown in Table 6 below. The output model results are provided as an attachment to this report.

TABLE 6: SCREEN3 Predicted Diesel-Fired Emission Concentrations

Criteria Pollutant	Pollutant Concentration ($\mu g/m^3$)	Pollutant Concentration (ppm)[42]	Pollutant Risk Probability (percent risk per person for 70-year exposure)	Significant?
CO	36.40	0.0317	n/a	No
NO_x	90.30	0.0480	n/a	No
SO_x	10.38	0.0040	n/a	No
PM_{10}	**2.47**	**- -**	**0.074%**	**No**
$PM_{2.5}$	2.27	- -	n/a	No
ROG	11.58	- -	n/a	No

Diesel risk calculation based upon ARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics inhaled in a 70-year lifetime. $PM_{2.5}$ levels based upon the CEIDARS database fractional emission factor for diesel construction equipment of 0.920 $PM_{2.5}$ / PM_{10}.

[42] Conversion Factors (approximate): CO: 1 ppm = 1,150 µg/m3 @ 25 deg-C STP, NOx: 1 ppm = 1,880 µg/m3 @ 25 deg-C STP, SOx: 1 ppm = 2,620 µg/m3 @ 25 deg-C STP, PM10 and PM2.5: 1 ppm = 1 g/m3 (solid).

Based upon the model results, all criteria pollutants were below the recommended health risk level with a PM_{10} risk probability of 0.074% (0.00074 in one million) per 70-year exposure duration, assuming the implementation of T-BACT.[43] The project was found to be in compliance with both the BAAQMD 8-hour and 1-hour CO thresholds with a maximum value of 0.03 ppm.

Given the PM_{10} findings, no significant carcinogenic impact potential is expected due to proposed operations. Additionally, the analysis identified a worst-case PM_{10} level of 2.47 $\mu g/m^3$ occurring at a distance of 138 meters (453 feet) from the project site. This pollutant concentration is below the California Ambient Air Quality Standard (CAAQS) of 50 $\mu g/m^3$ established by the State for any given 24-hour exposure period.[44]

Finally, anticipated diesel-fired $PM_{2.5}$ levels would not be expected to exceed 2.27 $\mu g/m^3$, which is also below the Federal NAAQS 24-hour threshold of 35 $\mu g/m^3$ (there are no State concentration threshold for this pollutant). No cumulative contribution of $PM_{2.5}$ from the site would be physically possible due to the reasons cited above.

Construction VOC/ROG Emission Potential and Risk Level

The OEHHA Point Assessment Approach results are provided in Table 7 on the following page. As was previously seen in Table 6 above, the project was found to produce an aggregate ROG level of 11.58 $\mu g/m^3$ due to all proposed activities. This equates to a calculated mean body mass dose ranging between 0.002 to 0.007 mg/kg/day depending on age group. Peak (95^{th} percentile) levels were found to have an age group distribution ranging between 0.003 to 0.012 mg/kg/day.

The health risk probability associated with the aforementioned inhaled body mass doses were found to be far below unity ranging from $4.20x10^{-6}$ to $1.83x10^{-4}$ assuming a full worst-case 70-year exposure duration, which is certainly not the case for the proposed SFBA pilot project. In terms of a population sample size of 100,000 individuals, this would equate to an excess cancer risk of between 0.4 to 18.4 per 100,000 individuals over a continuous 70-year exposure horizon. Since the proposed SFBA activities would occur over a period of approximately 450 days (15 months), the results would be de minimis when compared to other environmental risks.

Based on the findings, no inhaled health risk impacts are expected due to construction-related VOC/ROG generation from the proposed project.

[43] As part of T-BACT, contractors are required to utilize construction equipment, which are individually permitted through local air districts, or are registered under the Statewide Portable Equipment Registration Program (PERP).

[44] Additionally, Section 15355 of the CEQA Guidelines states: "Cumulative impacts" refers to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts."

TABLE 7: OEHHA Point Assessment Cancer Risk Potentials by Age Group

	Age Group Under Examination				
	0 to 2	**2 to 9**	**2 to 16**	**16 to 30**	**16 to 70**
Calculated Airborne Dose by Group (OEHHA Eq. 5.4.1.1)					
Mean Dose (mg/kg/day)	0.007	0.006	0.005	0.002	0.002
95th Percentile (mg/kg/day)	0.012	0.010	0.008	0.004	0.003
Calculated Inhaled Cancer Risk by Group (OEHHA Eq. 8.2.4)					
95th Percentile Inhaled Dose (mg/kg/day)	0.012	0.010	0.008	0.004	0.003
Benzene IPF Threshold (mg/kg/day)	0.100	0.100	0.100	0.100	0.100
Age Sensitivity Factor for a Specified Age Group (unitless)	10	3	3	1	1
Construction Duration (years)	1.25	1.25	1.25	1.25	1.25
Averaging Time for Lifetime Cancer Risk (years)	70	70	70	70	70
Fraction of Time Spent at Home (unitless)	0.85	0.72	0.72	0.73	0.73
Inhaled Cancer Risk Due to ROG (unitless)	1.8392E-04	3.6919E-05	3.1945E-05	4.8547E-06	4.2025E-06
Cancer Risk Due over 70 Years (Chances per 100,000 Individuals)	**18.4**	**3.7**	**3.2**	**0.5**	**0.4**

Source: Office of Environmental Health Hazard Assessment (OEHHA), 2015.

Odor Impact Potential from Proposed Site

The inhalation of VOC's causes smell sensations in humans. These odors can affect human health in four primary ways:

- The VOC's can produce toxicological effects;
- The odorant compounds can cause irritations in the eye, nose, and throat;
- The VOC's stimulate sensory nerves that can cause potentially harmful health effects; and,
- The exposure to perceived unpleasant odors can stimulate negative cognitive and emotional responses based on previous experiences with such odors.

Development of the proposed project site could generate trace amounts (less than 1 $\mu g/m^3$) of substances such as ammonia, carbon dioxide, hydrogen sulfide, methane, dust, organic dust, and endotoxins (i.e., bacteria are present in the dust).[45]

It should be noted that odor generation impacts due to the project are not expected to be significant, since any odor generation would be intermittent and would terminate upon completion of the project. As a result, no significant air quality impacts are expected to surrounding residential receptors. No mitigation for odors is identified.

Project Vehicular Emission Levels

The SFBA pilot project is expected to have a worst-case trip generation level of 25 ADT based upon projected estimates by the project applicant.[46] The average one-way trip length would be 50 miles given the proposed local service radius of the facility.

The CARB EMFAC 2017 running emission factors are shown in Table 8a on the following page for a median combined highway and surface street travel speed of 45 MPH.[47] The calculated operational daily emissions due to travel to, and from the project site, are tabulated in Table 8b on the same page. Based upon the findings, no significant impacts for any criteria pollutants were identified.

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[45] Additionally, proposed onsite uses could generate substances such as volatile organic acids, alcohols, aldehydes, amines, fixed gases, carbonyls, esters, sulfides, disulfides, mercaptans, and nitrogen heterocycles.

[46] Motor vehicles are the primary source of emissions associated with the proposed project area. Typically, uses such as the proposed project do not directly emit significant amounts of air pollutants from onsite activities. Rather, vehicular trips to and from these land uses are the significant contributor.

[47] Most roadways in California are classified as Community Collectors with a design speed of 45 MPH in order to facilitate stoplights, stop signs, cross-streets, and pedestrian crossing areas. The finding is also consistent with Section 275 of the California Vehicle Code pursuant to the definition of a Community Collector roadway. An average speed of 45 MPH is both reasonable and foreseeable given the current nature of the roadway network around the project site and the fact that the averaging mechanism mathematically minimizes errors due to variability of the driver's actions.

TABLE 8a: CARB EMFAC 2017 Year 2020 Emission Rates

	Criteria Pollutants Under Examination (in grams per mile)					
EMFAC 2017 Year 2020 Emission Rates	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Light Duty Auto (LDA)	0.729	0.049	0.002	0.001	0.001	0.010
Light Duty Truck (LDT1)	1.332	0.118	0.003	0.002	0.002	0.025
Medium Duty Truck (LHD1)	0.849	0.266	0.007	0.001	0.001	0.030
Heavy Duty Truck Gasoline (MH GAS)	1.731	0.470	0.015	0.001	0.001	0.053
Heavy Duty Truck Diesel (MH DSL)	0.303	4.144	0.009	0.099	0.095	0.059
Motorcycle (MCY)	17.838	1.130	0.002	0.001	0.001	1.878

TABLE 8b: Project Trip Generated Emissions – SFBA Pilot Project Site

		Criteria Pollutants Under Examination (in pounds per day)					
Proposed Project Action Emissions	**ADT**	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Light Duty Auto (LDA)	17	1.39	0.09	0.00	0.00	0.0	0.02
Light Duty Truck (LDT1)	5	0.71	0.06	0.00	0.00	0.0	0.01
Medium Duty Truck (LHD1)	2	0.15	0.05	0.00	0.00	0.0	0.01
Heavy Duty Truck Gasoline (MH GAS)	0	0.06	0.02	0.00	0.00	0.0	0.00
Heavy Duty Truck Diesel (MH DSL)	1	0.03	0.41	0.00	0.01	0.0	0.01
Motorcycle (MCY)	0	0.20	0.01	0.00	0.00	0.0	0.02
Total:	**25**	**2.5**	**0.6**	**0.0**	**0.0**	**0.0**	**0.1**
BAAQMD Significance Threshold:		**- -**	**54**	**- -**	**82**	**54**	**54**

Predicted Operational Emission Levels

As previously discussed, fixed emission sources under the context of this pilot project would consist of two different scenarios, namely:

- Scenario 1 assumes that the SFBA plant would utilize the excess flue gas from the Calpine LMEC site as the source of CO_2 generation in the pilot process, and,
- Scenario 2 assumes that the SFBA site would operate a registered 6.3 MBtu/hr natural gas boiler onsite.

Only one scenario will be ultimately selected as the CO_2 generation for the carbon capture and mineralization process of the pilot plant. Each of these scenarios is shown below in Table 9 along with the worst-case estimate for each criterion pollutant examined.

TABLE 9: SFBA Applicant Predicted Operational Emissions

Scenario	CO	NO_x	SO_x	PM_{10}	$PM_{2.5}$	ROG/VOC
Scenario 1: Flue Gas Extraction	2.80	1.92	0.00	0.86		0.37
Scenario 2: Onsite Boiler Utilization	5.76	2.72	0.00	1.13		0.82
Material Handling Dust Emissions				0.45	0.05	
Maximum Emissions Pounds/Day	**5.76**	**2.72**	**0.00**	**1.58**	**0.05**	**0.82**

Source: Atmospheric Dynamics, Inc. 4/19.

Thus, it is expected that operational emissions of the pilot plant would generate approximately 5.76 pounds of CO per day, 2.72 pounds of NO_x per day, 1.58 pounds of PM_{10} on a daily basis, and trace amounts of $PM_{2.5}$ and ROG/VOC's. These sources, in and of themselves, would not be classified as significant emission sources, and are not expected to generate an air quality impact.

CONCLUSIONS AND RECOMMENDATIONS

The aggregate emission levels produced by the proposed SFBA pilot project site are shown in Tables 10a and -b below. Based upon the findings, no construction or operational air quality impacts are anticipated due to the project.

TABLE 10a: Aggregate Emissions – SFBA Project Construction

	Aggregate Emissions for Criteria Pollutants					
SCENARIO EXAMINED	**CO**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Construction Vehicle Emissions (Table 4a)	12.4	27.4	3.6	0.8	0.7	4.0
Surface Grading Dust Generation	- -	- -	- -	0.3	0.1	- -
Powered Haulage Emission Generation for Construction Setup (Table 4b)	0.3	4.0	0.0	4.7	1.1	0.1
Total (Σ)	**12.7**	**31.4**	**3.6**	**5.8**	**1.9**	**4.1**
BAAQMD Significance Threshold:	**n/a**	**54**	**- -**	**82**	**54**	**54**

Values rounded to nearest tenth of a pound.

TABLE 10b: Aggregate Emissions – SFBA Project Operations

	Aggregate Emissions for Criteria Pollutants					
SCENARIO EXAMINED	**CO[48]**	**NO_x**	**SO_x**	**PM_{10}**	**$PM_{2.5}$**	**ROG**
Vehicular Traffic Generation (Table 8b)	2.5	0.6	0.0	0.0	0.0	0.1
Diesel Vehicle Emissions (Table 4a)	12.4	27.4	3.6	0.8	0.7	4.0
Powered Haulage Emission Generation for Material Handling (Table 4b)	0.3	4.0	0.0	4.7	1.1	0.1
Worst-Case Operational Emissions (Table 9)	5.8	2.7	0.0	1.6	0.1	0.8
Total (Σ)	**21.0**	**34.7**	**3.6**	**7.1**	**1.9**	**5.0**
BAAQMD Significance Threshold:	**- -**	**54**	**- -**	**82**	**54**	**54**

Values rounded to nearest tenth of a pound.

[48] It was previously shown in Table 6 that the project was found to be in compliance with both the BAAQMD 8-hour and 1-hour CO thresholds with a maximum value of 0.03 ppm. Thus, no impacts are expected.

CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE). The members of its professional staff contributing to the report are listed below:

Rick Tavares *(rtavares@ise.us)*	Ph.D. Civil Engineering M.S. Structural Engineering M.S. Mechanical Engineering B.S. Aerospace Engineering / Engineering Mechanics
Karen Tavares *(ktavares@ise.us)*	B.S. Electrical Engineering

ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810.

Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

Approved as to Form and Content:

Rick Tavares, Ph.D.

Project Principal
Investigative Science and Engineering, Inc. (ISE)

APPENDICES AND SUPPLEMENTAL INFORMATION

SCREEN3 Model Output for Criteria Pollutants: CO, NO_x, SO_x, PM_{10}, and ROG

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

SFBA MATERIAL HANDLING OPERARTIONS - CO

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =          AREA
   EMISSION RATE (G/(S-M**2)) =      .663340E-05
   SOURCE HEIGHT (M)          =       3.0000
   LENGTH OF LARGER SIDE (M)  =     100.2000
   LENGTH OF SMALLER SIDE (M) =     100.2000
   RECEPTOR HEIGHT (M)        =      10.0000
   URBAN/RURAL OPTION         =        URBAN
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST      CONC              U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)   (UG/M**3)   STAB   (M/S)  (M/S)    (M)   HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
    20.   17.34         3     1.0    1.0   320.0    3.00     45.
   100.   33.11         4     1.0    1.0   320.0    3.00     45.
   200.   31.61         5     1.0    1.0 10000.0    3.00     45.
   300.   21.76         5     1.0    1.0 10000.0    3.00     45.
   400.   15.39         5     1.0    1.0 10000.0    3.00     45.
   500.   11.42         5     1.0    1.0 10000.0    3.00     44.
   600.   8.837         5     1.0    1.0 10000.0    3.00     43.
   700.   7.081         5     1.0    1.0 10000.0    3.00     45.
   800.   5.833         5     1.0    1.0 10000.0    3.00     44.
   900.   4.913         5     1.0    1.0 10000.0    3.00     45.
  1000.   4.215         5     1.0    1.0 10000.0    3.00     45.
  1100.   3.671         5     1.0    1.0 10000.0    3.00     36.
  1200.   3.237         5     1.0    1.0 10000.0    3.00     45.
  1300.   2.886         5     1.0    1.0 10000.0    3.00     32.
  1400.   2.597         5     1.0    1.0 10000.0    3.00      1.
  1500.   2.355         5     1.0    1.0 10000.0    3.00      1.
  1600.   2.150         5     1.0    1.0 10000.0    3.00     26.
  1700.   1.975         5     1.0    1.0 10000.0    3.00     42.
  1800.   1.824         5     1.0    1.0 10000.0    3.00     41.
  1900.   1.693         5     1.0    1.0 10000.0    3.00     39.
  2000.   1.578         5     1.0    1.0 10000.0    3.00      1.
  2100.   1.476         5     1.0    1.0 10000.0    3.00      1.
  2200.   1.385         5     1.0    1.0 10000.0    3.00     32.
  2300.   1.305         5     1.0    1.0 10000.0    3.00     31.
  2400.   1.232         5     1.0    1.0 10000.0    3.00     16.
  2500.   1.167         5     1.0    1.0 10000.0    3.00     15.
  2600.   1.108         5     1.0    1.0 10000.0    3.00     14.
  2700.   1.054         5     1.0    1.0 10000.0    3.00     38.
  2800.   1.005         5     1.0    1.0 10000.0    3.00     40.
```

```
  2900.   .9596        5     1.0    1.0 10000.0    3.00     10.
  3000.   .9182        5     1.0    1.0 10000.0    3.00      8.
  3500.   .7536        5     1.0    1.0 10000.0    3.00      1.
  4000.   .6363        5     1.0    1.0 10000.0    3.00      5.
  4500.   .5495        5     1.0    1.0 10000.0    3.00     18.
  5000.   .4829        5     1.0    1.0 10000.0    3.00     22.
  5500.   .4302        5     1.0    1.0 10000.0    3.00     27.
  6000.   .3877        5     1.0    1.0 10000.0    3.00     31.
  6500.   .3525        5     1.0    1.0 10000.0    3.00     31.
  7000.   .3231        5     1.0    1.0 10000.0    3.00     22.
  7500.   .2982        5     1.0    1.0 10000.0    3.00     13.
  8000.   .2767        5     1.0    1.0 10000.0    3.00     11.
  8500.   .2581        5     1.0    1.0 10000.0    3.00      8.
  9000.   .2418        5     1.0    1.0 10000.0    3.00      6.
  9500.   .2274        5     1.0    1.0 10000.0    3.00      3.
 10000.   .2146        5     1.0    1.0 10000.0    3.00      1.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   138.   36.40        5     1.0    1.0 10000.0    3.00     45.

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       36.40          138.        0.
```

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

SFBA MATERIAL HANDLING OPERARTIONS - NOX

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =         AREA
   EMISSION RATE (G/(S-M**2))  =      .164580E-04
   SOURCE HEIGHT (M)          =       3.0000
   LENGTH OF LARGER SIDE (M)   =     100.2000
   LENGTH OF SMALLER SIDE (M)  =     100.2000
   RECEPTOR HEIGHT (M)        =      10.0000
   URBAN/RURAL OPTION         =        URBAN
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***
```

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	MAX DIR (DEG)
20.	43.01	3	1.0	1.0	320.0	3.00	45.
100.	82.15	4	1.0	1.0	320.0	3.00	45.
200.	78.42	5	1.0	1.0	10000.0	3.00	45.
300.	54.00	5	1.0	1.0	10000.0	3.00	45.
400.	38.17	5	1.0	1.0	10000.0	3.00	45.
500.	28.32	5	1.0	1.0	10000.0	3.00	44.
600.	21.92	5	1.0	1.0	10000.0	3.00	43.
700.	17.57	5	1.0	1.0	10000.0	3.00	45.
800.	14.47	5	1.0	1.0	10000.0	3.00	44.
900.	12.19	5	1.0	1.0	10000.0	3.00	45.
1000.	10.46	5	1.0	1.0	10000.0	3.00	45.
1100.	9.109	5	1.0	1.0	10000.0	3.00	36.
1200.	8.032	5	1.0	1.0	10000.0	3.00	45.
1300.	7.160	5	1.0	1.0	10000.0	3.00	32.
1400.	6.444	5	1.0	1.0	10000.0	3.00	1.
1500.	5.843	5	1.0	1.0	10000.0	3.00	1.
1600.	5.334	5	1.0	1.0	10000.0	3.00	26.
1700.	4.900	5	1.0	1.0	10000.0	3.00	42.
1800.	4.526	5	1.0	1.0	10000.0	3.00	41.
1900.	4.200	5	1.0	1.0	10000.0	3.00	39.
2000.	3.915	5	1.0	1.0	10000.0	3.00	1.
2100.	3.662	5	1.0	1.0	10000.0	3.00	1.
2200.	3.437	5	1.0	1.0	10000.0	3.00	32.
2300.	3.237	5	1.0	1.0	10000.0	3.00	31.
2400.	3.058	5	1.0	1.0	10000.0	3.00	16.
2500.	2.896	5	1.0	1.0	10000.0	3.00	15.
2600.	2.749	5	1.0	1.0	10000.0	3.00	14.
2700.	2.615	5	1.0	1.0	10000.0	3.00	38.
2800.	2.493	5	1.0	1.0	10000.0	3.00	40.
2900.	2.381	5	1.0	1.0	10000.0	3.00	10.
3000.	2.278	5	1.0	1.0	10000.0	3.00	8.
3500.	1.870	5	1.0	1.0	10000.0	3.00	1.
4000.	1.579	5	1.0	1.0	10000.0	3.00	5.

```
  4500.   1.363        5     1.0    1.0 10000.0    3.00     18.
  5000.   1.198        5     1.0    1.0 10000.0    3.00     22.
  5500.   1.067        5     1.0    1.0 10000.0    3.00     27.
  6000.   .9618        5     1.0    1.0 10000.0    3.00     31.
  6500.   .8747        5     1.0    1.0 10000.0    3.00     31.
  7000.   .8017        5     1.0    1.0 10000.0    3.00     22.
  7500.   .7398        5     1.0    1.0 10000.0    3.00     13.
  8000.   .6866        5     1.0    1.0 10000.0    3.00     11.
  8500.   .6404        5     1.0    1.0 10000.0    3.00      8.
  9000.   .6000        5     1.0    1.0 10000.0    3.00      6.
  9500.   .5643        5     1.0    1.0 10000.0    3.00      3.
 10000.   .5325        5     1.0    1.0 10000.0    3.00      1.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   138.   90.30        5     1.0    1.0 10000.0    3.00     45.

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      90.30          138.        0.
```

```
 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

SFBA MATERIAL HANDLING OPERARTIONS - SOX

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =         AREA
   EMISSION RATE (G/(S-M**2))  =      .189180E-05
   SOURCE HEIGHT (M)          =       3.0000
   LENGTH OF LARGER SIDE (M)   =     100.2000
   LENGTH OF SMALLER SIDE (M)  =     100.2000
   RECEPTOR HEIGHT (M)        =      10.0000
   URBAN/RURAL OPTION         =        URBAN
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC              U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
    20.   4.944        3     1.0    1.0   320.0    3.00     45.
   100.   9.442        4     1.0    1.0   320.0    3.00     45.
   200.   9.014        5     1.0    1.0 10000.0    3.00     45.
   300.   6.207        5     1.0    1.0 10000.0    3.00     45.
   400.   4.388        5     1.0    1.0 10000.0    3.00     45.
   500.   3.256        5     1.0    1.0 10000.0    3.00     44.
   600.   2.520        5     1.0    1.0 10000.0    3.00     43.
   700.   2.019        5     1.0    1.0 10000.0    3.00     45.
   800.   1.664        5     1.0    1.0 10000.0    3.00     44.
   900.   1.401        5     1.0    1.0 10000.0    3.00     45.
  1000.   1.202        5     1.0    1.0 10000.0    3.00     45.
  1100.   1.047        5     1.0    1.0 10000.0    3.00     36.
  1200.   .9233        5     1.0    1.0 10000.0    3.00     45.
  1300.   .8231        5     1.0    1.0 10000.0    3.00     32.
  1400.   .7408        5     1.0    1.0 10000.0    3.00      1.
  1500.   .6716        5     1.0    1.0 10000.0    3.00      1.
  1600.   .6131        5     1.0    1.0 10000.0    3.00     26.
  1700.   .5632        5     1.0    1.0 10000.0    3.00     42.
  1800.   .5203        5     1.0    1.0 10000.0    3.00     41.
  1900.   .4828        5     1.0    1.0 10000.0    3.00     39.
  2000.   .4500        5     1.0    1.0 10000.0    3.00      1.
  2100.   .4210        5     1.0    1.0 10000.0    3.00      1.
  2200.   .3951        5     1.0    1.0 10000.0    3.00     32.
  2300.   .3721        5     1.0    1.0 10000.0    3.00     31.
  2400.   .3515        5     1.0    1.0 10000.0    3.00     16.
  2500.   .3328        5     1.0    1.0 10000.0    3.00     15.
  2600.   .3159        5     1.0    1.0 10000.0    3.00     14.
  2700.   .3006        5     1.0    1.0 10000.0    3.00     38.
  2800.   .2865        5     1.0    1.0 10000.0    3.00     40.
  2900.   .2737        5     1.0    1.0 10000.0    3.00     10.
  3000.   .2619        5     1.0    1.0 10000.0    3.00      8.
  3500.   .2149        5     1.0    1.0 10000.0    3.00      1.
  4000.   .1815        5     1.0    1.0 10000.0    3.00      5.
```

```
  4500.   .1567        5     1.0    1.0 10000.0    3.00     18.
  5000.   .1377        5     1.0    1.0 10000.0    3.00     22.
  5500.   .1227        5     1.0    1.0 10000.0    3.00     27.
  6000.   .1106        5     1.0    1.0 10000.0    3.00     31.
  6500.   .1005        5     1.0    1.0 10000.0    3.00     31.
  7000.   .9215E-01    5     1.0    1.0 10000.0    3.00     22.
  7500.   .8504E-01    5     1.0    1.0 10000.0    3.00     13.
  8000.   .7892E-01    5     1.0    1.0 10000.0    3.00     11.
  8500.   .7361E-01    5     1.0    1.0 10000.0    3.00      8.
  9000.   .6897E-01    5     1.0    1.0 10000.0    3.00      6.
  9500.   .6486E-01    5     1.0    1.0 10000.0    3.00      3.
 10000.   .6121E-01    5     1.0    1.0 10000.0    3.00      1.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   138.   10.38        5     1.0    1.0 10000.0    3.00     45.

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       10.38          138.        0.
```

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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

SFBA MATERIAL HANDLING OPERARTIONS - PM10

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =         AREA
   EMISSION RATE (G/(S-M**2))  =      .449460E-06
   SOURCE HEIGHT (M)          =       3.0000
   LENGTH OF LARGER SIDE (M)   =     100.2000
   LENGTH OF SMALLER SIDE (M)  =     100.2000
   RECEPTOR HEIGHT (M)        =      10.0000
   URBAN/RURAL OPTION         =        URBAN
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC             U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
    20.   1.175        3     1.0    1.0   320.0    3.00     45.
   100.   2.243        4     1.0    1.0   320.0    3.00     45.
   200.   2.142        5     1.0    1.0 10000.0    3.00     45.
   300.   1.475        5     1.0    1.0 10000.0    3.00     45.
   400.   1.043        5     1.0    1.0 10000.0    3.00     45.
   500.   .7735        5     1.0    1.0 10000.0    3.00     44.
   600.   .5987        5     1.0    1.0 10000.0    3.00     43.
   700.   .4798        5     1.0    1.0 10000.0    3.00     45.
   800.   .3952        5     1.0    1.0 10000.0    3.00     44.
   900.   .3329        5     1.0    1.0 10000.0    3.00     45.
  1000.   .2856        5     1.0    1.0 10000.0    3.00     45.
  1100.   .2487        5     1.0    1.0 10000.0    3.00     36.
  1200.   .2194        5     1.0    1.0 10000.0    3.00     45.
  1300.   .1955        5     1.0    1.0 10000.0    3.00     32.
  1400.   .1760        5     1.0    1.0 10000.0    3.00      1.
  1500.   .1596        5     1.0    1.0 10000.0    3.00      1.
  1600.   .1457        5     1.0    1.0 10000.0    3.00     26.
  1700.   .1338        5     1.0    1.0 10000.0    3.00     42.
  1800.   .1236        5     1.0    1.0 10000.0    3.00     41.
  1900.   .1147        5     1.0    1.0 10000.0    3.00     39.
  2000.   .1069        5     1.0    1.0 10000.0    3.00      1.
  2100.   .1000        5     1.0    1.0 10000.0    3.00      1.
  2200.   .9387E-01    5     1.0    1.0 10000.0    3.00     32.
  2300.   .8841E-01    5     1.0    1.0 10000.0    3.00     31.
  2400.   .8350E-01    5     1.0    1.0 10000.0    3.00     16.
  2500.   .7908E-01    5     1.0    1.0 10000.0    3.00     15.
  2600.   .7506E-01    5     1.0    1.0 10000.0    3.00     14.
  2700.   .7141E-01    5     1.0    1.0 10000.0    3.00     38.
  2800.   .6807E-01    5     1.0    1.0 10000.0    3.00     40.
  2900.   .6502E-01    5     1.0    1.0 10000.0    3.00     10.
  3000.   .6221E-01    5     1.0    1.0 10000.0    3.00      8.
  3500.   .5106E-01    5     1.0    1.0 10000.0    3.00      1.
  4000.   .4311E-01    5     1.0    1.0 10000.0    3.00      5.
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  4500.   .3723E-01    5     1.0    1.0 10000.0    3.00     18.
  5000.   .3272E-01    5     1.0    1.0 10000.0    3.00     22.
  5500.   .2915E-01    5     1.0    1.0 10000.0    3.00     27.
  6000.   .2627E-01    5     1.0    1.0 10000.0    3.00     31.
  6500.   .2389E-01    5     1.0    1.0 10000.0    3.00     31.
  7000.   .2189E-01    5     1.0    1.0 10000.0    3.00     22.
  7500.   .2020E-01    5     1.0    1.0 10000.0    3.00     13.
  8000.   .1875E-01    5     1.0    1.0 10000.0    3.00     11.
  8500.   .1749E-01    5     1.0    1.0 10000.0    3.00      8.
  9000.   .1639E-01    5     1.0    1.0 10000.0    3.00      6.
  9500.   .1541E-01    5     1.0    1.0 10000.0    3.00      3.
 10000.   .1454E-01    5     1.0    1.0 10000.0    3.00      1.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   138.   2.466        5     1.0    1.0 10000.0    3.00     45.

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       2.466          138.        0.
```

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 ***  SCREEN3 MODEL RUN  ***
 *** VERSION DATED 96043 ***

SFBA MATERIAL HANDLING OPERARTIONS - ROG

SIMPLE TERRAIN INPUTS:
   SOURCE TYPE                =          AREA
   EMISSION RATE (G/(S-M**2))  =      .211050E-05
   SOURCE HEIGHT (M)          =       3.0000
   LENGTH OF LARGER SIDE (M)   =     100.2000
   LENGTH OF SMALLER SIDE (M)  =     100.2000
   RECEPTOR HEIGHT (M)        =      10.0000
   URBAN/RURAL OPTION         =        URBAN
THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

   MODEL ESTIMATES DIRECTION TO MAX CONCENTRATION


BUOY. FLUX =     .000 M**4/S**3;  MOM. FLUX =     .000 M**4/S**2.

*** FULL METEOROLOGY ***

**********************************
*** SCREEN AUTOMATED DISTANCES ***
**********************************

*** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

  DIST     CONC              U10M   USTK  MIX HT   PLUME  MAX DIR
   (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   (DEG)
-------  ----------  ----  -----  -----  ------  ------  -------
    20.   5.516        3     1.0    1.0   320.0    3.00     45.
   100.   10.53        4     1.0    1.0   320.0    3.00     45.
   200.   10.06        5     1.0    1.0 10000.0    3.00     45.
   300.   6.924        5     1.0    1.0 10000.0    3.00     45.
   400.   4.895        5     1.0    1.0 10000.0    3.00     45.
   500.   3.632        5     1.0    1.0 10000.0    3.00     44.
   600.   2.811        5     1.0    1.0 10000.0    3.00     43.
   700.   2.253        5     1.0    1.0 10000.0    3.00     45.
   800.   1.856        5     1.0    1.0 10000.0    3.00     44.
   900.   1.563        5     1.0    1.0 10000.0    3.00     45.
  1000.   1.341        5     1.0    1.0 10000.0    3.00     45.
  1100.   1.168        5     1.0    1.0 10000.0    3.00     36.
  1200.   1.030        5     1.0    1.0 10000.0    3.00     45.
  1300.   .9182        5     1.0    1.0 10000.0    3.00     32.
  1400.   .8264        5     1.0    1.0 10000.0    3.00      1.
  1500.   .7492        5     1.0    1.0 10000.0    3.00      1.
  1600.   .6840        5     1.0    1.0 10000.0    3.00     26.
  1700.   .6283        5     1.0    1.0 10000.0    3.00     42.
  1800.   .5804        5     1.0    1.0 10000.0    3.00     41.
  1900.   .5386        5     1.0    1.0 10000.0    3.00     39.
  2000.   .5020        5     1.0    1.0 10000.0    3.00      1.
  2100.   .4697        5     1.0    1.0 10000.0    3.00      1.
  2200.   .4408        5     1.0    1.0 10000.0    3.00     32.
  2300.   .4151        5     1.0    1.0 10000.0    3.00     31.
  2400.   .3921        5     1.0    1.0 10000.0    3.00     16.
  2500.   .3713        5     1.0    1.0 10000.0    3.00     15.
  2600.   .3525        5     1.0    1.0 10000.0    3.00     14.
  2700.   .3353        5     1.0    1.0 10000.0    3.00     38.
  2800.   .3196        5     1.0    1.0 10000.0    3.00     40.
  2900.   .3053        5     1.0    1.0 10000.0    3.00     10.
  3000.   .2921        5     1.0    1.0 10000.0    3.00      8.
  3500.   .2398        5     1.0    1.0 10000.0    3.00      1.
  4000.   .2024        5     1.0    1.0 10000.0    3.00      5.
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  4500.   .1748        5     1.0    1.0 10000.0    3.00     18.
  5000.   .1536        5     1.0    1.0 10000.0    3.00     22.
  5500.   .1369        5     1.0    1.0 10000.0    3.00     27.
  6000.   .1233        5     1.0    1.0 10000.0    3.00     31.
  6500.   .1122        5     1.0    1.0 10000.0    3.00     31.
  7000.   .1028        5     1.0    1.0 10000.0    3.00     22.
  7500.   .9487E-01    5     1.0    1.0 10000.0    3.00     13.
  8000.   .8804E-01    5     1.0    1.0 10000.0    3.00     11.
  8500.   .8212E-01    5     1.0    1.0 10000.0    3.00      8.
  9000.   .7694E-01    5     1.0    1.0 10000.0    3.00      6.
  9500.   .7236E-01    5     1.0    1.0 10000.0    3.00      3.
 10000.   .6829E-01    5     1.0    1.0 10000.0    3.00      1.

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND    20. M:
   138.   11.58        5     1.0    1.0 10000.0    3.00     45.

     ************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------     -----------   -------   -------
SIMPLE TERRAIN       11.58          138.        0.
```

EMFAC 2017 EMISSION FACTOR TABULATIONS – SCENARIO YEAR 2020

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: CONTRA COSTA
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	CO_RUNEX	NOx_RUNEX	SOx_RUNEX	PM10_RUNEX	PM2_5_RUNEX	ROG_RUNEX	CO2_RUNEX
CONTRA COSTA	**2020**	**LDA**	**Aggregated**	**45**	**GAS**	**387166.7409**	**0.729271714**	**0.048728631**	**0.002472466**	**0.001193598**	**0.001097492**	**0.009936701**	**249.8497649**
CONTRA COSTA	2020	LDA	Aggregated	45	DSL	4005.649273	0.176941811	0.113463235	0.001727677	0.008258802	0.00790153	0.013849134	182.7534492
CONTRA COSTA	**2020**	**LDT1**	**Aggregated**	**45**	**GAS**	**40081.42574**	**1.332219029**	**0.118128814**	**0.002886907**	**0.001696728**	**0.001560188**	**0.024571193**	**291.7301683**
CONTRA COSTA	2020	LDT1	Aggregated	45	DSL	13.90970071	1.074770296	1.307576425	0.003476592	0.126804796	0.121319277	0.17009827	367.7533936
CONTRA COSTA	2020	LDT2	Aggregated	45	GAS	134480.6268	0.938920497	0.089040629	0.003169294	0.001160226	0.001066818	0.014068092	320.2662294
CONTRA COSTA	2020	LDT2	Aggregated	45	DSL	888.072667	0.090059156	0.03911596	0.002365519	0.004494442	0.004300015	0.010570133	250.2241971
CONTRA COSTA	**2020**	**LHD1**	**Aggregated**	**45**	**GAS**	**5622.887648**	**0.849483672**	**0.265727655**	**0.00721481**	**0.000969462**	**0.0008918**	**0.029541048**	**729.0772315**
CONTRA COSTA	2020	LHD1	Aggregated	45	DSL	10736.87332	0.457730243	2.998245791	0.004227584	0.019225528	0.01839384	0.08304297	447.1931611
CONTRA COSTA	2020	LHD2	Aggregated	45	GAS	672.2672875	0.657697081	0.245348066	0.008222078	0.000864567	0.000794937	0.021717497	830.864516
CONTRA COSTA	2020	LHD2	Aggregated	45	DSL	3585.063232	0.3723974	2.241936658	0.004669972	0.017280011	0.016532485	0.067629136	493.9889781
CONTRA COSTA	**2020**	**MCY**	**Aggregated**	**45**	**GAS**	**3966.782721**	**17.8383195**	**1.129705635**	**0.001874301**	**0.00148569**	**0.001393997**	**1.877961948**	**189.4034375**
CONTRA COSTA	2020	MDV	Aggregated	45	GAS	92065.46955	1.237172965	0.134683768	0.00388131	0.00127936	0.001177419	0.024543884	392.2175087
CONTRA COSTA	2020	MDV	Aggregated	45	DSL	2096.076883	0.151897664	0.060349339	0.003118081	0.005182304	0.00495812	0.009637681	329.8300964
CONTRA COSTA	**2020**	**MH**	**Aggregated**	**45**	**GAS**	**2039.709002**	**1.73062632**	**0.469685052**	**0.015243032**	**0.001115392**	**0.001026102**	**0.052546548**	**1540.352045**
CONTRA COSTA	**2020**	**MH**	**Aggregated**	**45**	**DSL**	**617.1566844**	**0.302883551**	**4.143920222**	**0.008870647**	**0.099414111**	**0.095113501**	**0.059295712**	**938.335768**
CONTRA COSTA	2020	Motor Coach	Aggregated	45	DSL	74.99117547	0.682509598	4.066897321	0.012858516	0.08095037	0.077448492	0.160853615	1361.048958
CONTRA COSTA	2020	OBUS	Aggregated	45	GAS	1699.201298	2.373881116	0.718238713	0.015294526	0.000591102	0.000543978	0.071313382	1545.55568
CONTRA COSTA	2020	SBUS	Aggregated	45	GAS	117.8156669	0.923218413	0.300476334	0.006945744	0.000711367	0.000654076	0.028044569	701.8873411
CONTRA COSTA	2020	SBUS	Aggregated	45	DSL	991.6605538	0.113795893	3.37678951	0.008567343	0.017370183	0.016618757	0.030186134	906.8366537
CONTRA COSTA	2020	T6 Ag	Aggregated	45	DSL	2.322875592	1.930687785	8.288701752	0.009850121	0.375279577	0.359045149	0.538031118	1042.616225
CONTRA COSTA	2020	T6 CAIRP heavy	Aggregated	45	DSL	79.08670437	0.127960762	1.081700365	0.007458995	0.021128822	0.020214798	0.028849286	789.5201954
CONTRA COSTA	2020	T6 CAIRP small	Aggregated	45	DSL	10.66773977	0.217898126	1.400846128	0.007933221	0.038608924	0.036938719	0.053281524	839.7160129
CONTRA COSTA	2020	T6 instate construction heavy	Aggregated	45	DSL	454.1095746	0.505590672	3.675700494	0.008777777	0.087038328	0.083273088	0.132015292	929.1107262
CONTRA COSTA	2020	T6 instate construction small	Aggregated	45	DSL	831.0002582	0.512527508	2.733137955	0.008513488	0.091696828	0.087730064	0.131421767	901.1361527
CONTRA COSTA	2020	T6 instate heavy	Aggregated	45	DSL	3333.934338	0.394055786	2.870833832	0.008191185	0.063892347	0.061128392	0.101219731	867.0210231
CONTRA COSTA	2020	T6 instate small	Aggregated	45	DSL	5373.48919	0.598573278	3.1516974	0.008689747	0.106731221	0.102114076	0.154690115	919.7928528
CONTRA COSTA	2020	T6 OOS heavy	Aggregated	45	DSL	43.57936995	0.129150303	1.053776417	0.007471557	0.021913567	0.020965596	0.029156923	790.8498308
CONTRA COSTA	2020	T6 OOS small	Aggregated	45	DSL	6.223591735	0.224343216	1.422657313	0.007938861	0.039808237	0.03808615	0.054933553	840.3130452
CONTRA COSTA	2020	T6 Public	Aggregated	45	DSL	1048.200081	0.113980524	4.396979005	0.008979156	0.022690136	0.021708571	0.032764451	950.426209
CONTRA COSTA	2020	T6 utility	Aggregated	45	DSL	129.0543018	0.055749257	1.25888523	0.008196963	0.007289303	0.006973971	0.012963269	867.6326362
CONTRA COSTA	2020	T6TS	Aggregated	45	GAS	4487.17646	2.523253295	0.688843381	0.014951967	0.000931377	0.000856367	0.076357885	1510.939056
CONTRA COSTA	2020	T7 Ag	Aggregated	45	DSL	1.476011826	5.017299605	17.94447106	0.015652487	0.709312622	0.678628072	1.112014835	1656.785404
CONTRA COSTA	2020	T7 CAIRP	Aggregated	45	DSL	1906.573659	0.249430247	2.291048646	0.011211498	0.030862515	0.029527416	0.051197907	1186.715359
CONTRA COSTA	2020	T7 CAIRP construction	Aggregated	45	DSL	338.3044876	0.243883759	2.240122618	0.011595928	0.030181115	0.028875493	0.04995149	1227.406487
CONTRA COSTA	2020	T7 NNOOS	Aggregated	45	DSL	2324.475754	0.268287829	1.963646563	0.010742864	0.03623146	0.034664103	0.054619615	1137.111306
CONTRA COSTA	2020	T7 NOOS	Aggregated	45	DSL	749.0489815	0.239250157	2.246956484	0.011211349	0.030270452	0.028960965	0.049326955	1186.699516
CONTRA COSTA	2020	T7 other port	Aggregated	45	DSL	1114.209252	0.300945066	3.947674733	0.013439629	0.030762789	0.029432005	0.09220972	1422.558657
CONTRA COSTA	2020	T7 POAK	Aggregated	45	DSL	5996.90892	0.342281618	4.515072074	0.013890499	0.034469744	0.032978598	0.109546689	1470.282388
CONTRA COSTA	2020	T7 Public	Aggregated	45	DSL	1133.668107	0.300979376	9.491142177	0.014423836	0.049569272	0.047424928	0.066348447	1526.735071
CONTRA COSTA	2020	T7 Single	Aggregated	45	DSL	1815.765135	0.689242273	4.866231512	0.013080359	0.099860996	0.095541053	0.16510481	1384.530592
CONTRA COSTA	2020	T7 single construction	Aggregated	45	DSL	839.2712094	0.605719535	4.880842764	0.012972797	0.08542345	0.08172807	0.143535151	1373.145413
CONTRA COSTA	2020	T7 SWCV	Aggregated	45	DSL	787.9561754	0.039375495	8.258597478	0.033953343	0.01109988	0.010619704	0.015423515	3593.895501
CONTRA COSTA	2020	T7 SWCV	Aggregated	45	NG	862.9402644	3.916552264	0.928451696	0	0.00388317	0.003715186	0.050082131	2780.007105
CONTRA COSTA	2020	T7 tractor	Aggregated	45	DSL	5553.959599	0.551369098	3.96031569	0.01211516	0.06750976	0.064589318	0.132112966	1282.366179
CONTRA COSTA	2020	T7 tractor construction	Aggregated	45	DSL	692.3248576	0.626908422	4.60262276	0.012937462	0.078729668	0.075323857	0.15431848	1369.405321
CONTRA COSTA	2020	T7 utility	Aggregated	45	DSL	86.76604441	0.15180775	3.764480376	0.013544557	0.015766178	0.01508414	0.037632863	1433.665117
CONTRA COSTA	2020	T7IS	Aggregated	45	GAS	38.00499836	37.67528889	3.730512146	0.018869598	0.001533054	0.001426884	0.564032961	1906.82693
CONTRA COSTA	2020	UBUS	Aggregated	45	GAS	50.44262803	0.108702918	0.084941911	0.008463109	0.000199253	0.000183205	0.004270481	855.2213599
CONTRA COSTA	2020	UBUS	Aggregated	45	DSL	311.7075753	0.076135541	1.454010379	0.011034364	0.00839524	0.008032066	0.000739994	1167.213421
CONTRA COSTA	2020	UBUS	Aggregated	45	NG	43.84507082	37.00020635	0.313112372	0	0.001019021	0.000974938	0.058473597	1462.977517
CONTRA COSTA	2020	All Other Buses	Aggregated	45	DSL	767.9265241	0.624895918	3.842823011	0.008522789	0.094790066	0.09068949	0.162041431	902.120651

AVAILABLE ONLINE CONTENT

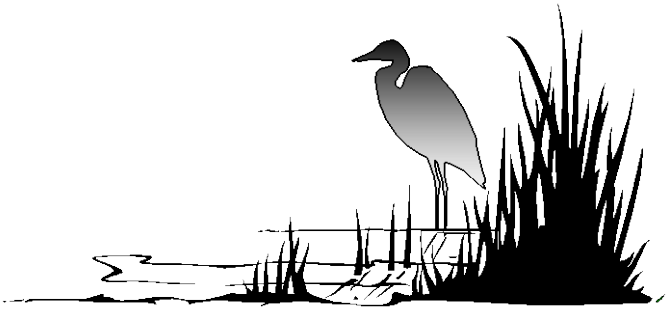
The following high-resolution graphical content from this report is available online at the website links shown below. Use of this material is subject to ISE's electronic file distribution policy available at: *http://www.ise.us/index.php/filepolicy*.

CONTENT	DOWNLOAD LINK
Project Study Area Vicinity Map	*http://www.ise.us/projects/19004/1.jpg*
Project Study Area Parcel Map Showing Nearby Sensitive Receptors	*http://www.ise.us/projects/19004/2.jpg*
Aerial Image Showing Development Area and Surrounding Uses	*http://www.ise.us/projects/19004/3.jpg*
Proposed San Francisco Bay Aggregates Development Plan	*http://www.ise.us/projects/19004/4.jpg*
Ambient Air Quality Standards Matrix	*http://www.ise.us/projects/19004/5.jpg*
Ambient Air Quality Monitoring Station Location Map	*http://www.ise.us/projects/19004/6.jpg*
Project Air Basin Aerial Map	*http://www.ise.us/projects/19004/7.jpg*

INDEX OF TERMS USED IN REPORT

Appendix B

BIOLOGICAL RESOURCE ASSESSMENT
FOR
CARBON CAPTURE AND MINERALIZATION PROJECT
895 EAST THIRD STREET
CITY OF PITTSBURG
CONTRA COSTA COUNTY, CALIFORNIA



May 2019

Prepared for:

Brezack & Associates Planning
3000 Citrus Circle, Suite 210
Walnut Creek, CA 94598

Prepared by:
Wood Biological Consulting
PO Box 1569
El Granada, CA 94108
(415) 254-4835
chris@wood-biological.com

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SUMMARY

This report presents the results of an assessment of existing and potentially occurring biological resources on an industrial parcel in the City of Pittsburg, Contra Costa County, California. The report provides background and site-specific information pertaining to special-status plants, wildlife species and habitats, which may represent constraints to the proposed activities.

The biological study area (BSA) is located at 895 E. Third Street. The property is bordered by existing industrial facilities and open fallow fields. A small portion of the site is situated on the shoreline of New York Slough just upstream (east) of the confluence with the Sacramento River, opposite of Browns Island, and 1.0 km (0.6 mi) east of the Pittsburg Marina.

The site is largely paved. The existing vegetation on the site is mostly non-native ruderal (i.e. weedy) plants with landscaping trees and shrubs. A small portion of the site is on the shoreline of New York Slough, which is armored (i.e. riprapped), and supports very sparse freshwater marsh plants. Although jurisdictional wetlands and other waters are present, no special status natural communities are located in the study area.

A total of 81 special-status plant species have been recorded from the nine 7.5-minute USGS quadrangles including and surrounding the BSA. A total of 8 special-status plant species have been recorded from within a within 1.6 km (1 mi) of the BSA. One special status species, Mason's lilaeopsis, is present in the BSA at the discharge point of a stormwater outfall. No Federal listed, Proposed, or Candidate plant species are considered to have potential to occur in the study area. Marginal habitat exists for one other non-listed special-status species, Suisun marsh aster.

A total of 86 special-status animal species have been recorded in the nine 7.5-minute USGS quadrangles including and surrounding the BSA. A total of 17 special-status animal species have been recorded from within a 4.8 km (3 mi) radius of the BSA (Figure 6). Based on the existing habitats on site and its geographic location, the occurrence of 72 of these species can be ruled out entirely based on absence of suitable habitat, the site's location outside of the species known range, or absence of regional species occurrences. Although marginally suitable habitat is present within the BSA, the occurrence of another eight of these species are not expected to occur on site due to the site's level of disturbance, habitat alteration, or geographic location relative to known occurrences.

Although not detected during the present survey, eight of the species could occur within the study area. Six of these are fish species and include Chinook salmon, Delta smelt, longfin smelt (San Francisco bay delta DPS), green sturgeon, Sacramento splittail, and

steelhead (Central Valley DPS and Central California Coast DPS). Also potentially occurring within the study area are Pacific pond turtle, bank swallow, and a wide variety of migratory bird species. Two marine mammals, harbor seal and California sea lion, are known to move through the project vicinity.

The proposed project would not result in significant direct or indirect impacts on special-status plants, wildlife, and habitats. Impact avoidance measures are recommended to include as part of the proposed project. These measures are outlined in the report to reduce potential impacts to a less-than-significant level. With the incorporation of the avoidance measures outlined in this report, project implementation would not result in any potentially significant adverse biological effects.

1.0 INTRODUCTION

This report presents the results of a biological assessment of a portion of two industrial parcel (APN 073-020-019 and 073-020-015) at 895 E. Third Street in the City of Pittsburg, Contra Costa County, California (Figures 1 and 2). The property is leased by San Francisco Bay Aggregates (Applicant), which proposes to build a carbon mineralization and recapture facility on the site.

The purpose of this Biological Resource Assessment (BRA) is to identify biological resources that are present or that might be present the project site, and that could constrain proposed maintenance actions. Biological constraints consist of federally and state-listed endangered and rare species[1] and their habitats, other special-status species regulated under state or local laws or ordinances, wetlands and other aquatic habitats, and other special-status natural communities. The report provides background and site-specific information pertaining to special-status plant and wildlife species and other regulated biological resources (e.g., wetlands, other waters, natural communities, and protected trees) which represent potential constraints to the proposed activity. The BRA also identifies appropriate impact avoidance measures for potential impacts that may result from project implementation.

This BRA has been prepared to facilitate an environmental review by the lead agency (the City of Pittsburg) in conformance with the guidelines of the California Environmental Quality Act (CEQA). It is also intended to support review by federal and State regulatory agencies with jurisdiction over the project.

1.1 Project Setting

The Applicant is proposing to construct the first phase of a carbon mineralization and recapture facility on a former industrial site near New York Slough. The parcel occupies approximately 2.5 ac. An existing stormwater outfall and 6-inch thermal wastewater discharge outfall occupy approximately 25 lf of shoreline. The site is approximately 95% paved, and includes several buildings, and pads and other appurtenances remaining from past use.

[1] For purposes of this analysis, the term species includes all taxa at the species, subspecies or variety taxonomic levels.

Figure 1. Project Location

Figure 2. Aerial View of Project Location

Source: Google Earth, 2019

1.2 Project Description

The proposed project would reuse a former industrial site within an industrial-zoned area of Pittsburg. The primary function of the proposed project is to take flue gas from local ready-mix concrete producers and recyclers to produce CO_2-sequestered and upcycled rocks for fresh concrete production. On a temporary basis, the CO_2 outlet stream of gas from the gas-fired steam boiler process equipment would be used until the flue gas transfer operations are online.

The proposed project would link together four component modules into a cycle for the overall Process. A module is a set of equipment from which an interim product is produced. Each module is made separately, and the completed modules are joined together to form the process of producing ingredients for fresh concrete production. The four modules are presented on Figure 4 are:

1. CO_2 Capture Module – removal of CO_2 from flue gas,
2. Carbonate Coating Module – calcium carbonate ($CaCO_3$) coating on the surface of the substrate rock,
3. Reformation Module – creation of upcycled rock for coating or placement in fresh concrete, and
4. Stripper Module– separation of aqueous ammonia and calcium chloride solutions for use in the CO_2 Capture and Carbonate Coating modules.

The construction of the proposed project would not require any disturbance of soil beneath the existing site caps. The majority of the equipment would be skid mounted for mobilization to and from the proposed project site. No new foundation construction or new buildings would be constructed.

The duration of construction of the proposed project is estimated to be 3 to 4 months. It is estimated that a maximum of six construction workers are required. Construction activity entails off-loading transported equipment and connecting the separate Modules together.

2.0 METHODS AND LIMITATIONS

2.1 Definitions

The following terms are used to evaluate habitat suitability and on-site biological resources.

Biological Study Area The biological study area (BSA) encompasses the project footprint and adjacent lands within a radius of approximately 31 m (100 ft; see Figure 2).

Project Footprint The project footprint is based on the proposed limits of work shown on the site plans (see Attachment 5 of this JARPA submittal). Construction-related activities within the project footprint include vegetation clearing, grading, soil stabilization, and construction of permanent and temporary facilities.

2.2 Data Sources

Lists of potentially occurring special-status plant and animal species were compiled based on a review of databases maintained by the California Natural Diversity Database (CNDDB, 2019), the U.S. Fish and Wildlife Service (USFWS, 2019), and the California Native Plant Society (CNPS, 2019). Botanical nomenclature conforms to the Jepson Online Interchange (Jepson Herbarium, no date) and Baldwin, et al (2012). Common names of plant species[2] are derived from Calflora (2019). Plant habitat affinities and local distribution information was obtained from Lake (2010), Ertter and Bowerman (2002), and Ertter and Naumovich (2013). Nomenclature for special-status plant species conforms to the California Department of Fish and Wildlife (CDFW[3]; CDFW 2018c,d).

Nomenclature for common wildlife species conforms to CDFW (2016), with taxonomic nomenclature updates conforming to the American Ornithologist's Union and supplements (AOU, 2018) for birds, Jennings (2004) for amphibians and reptiles, and the American Society of Mammologists (ASM, 2018) for mammals. Nomenclature for freshwater, anadromous, and euryhaline fishes conforms to Moyle and Davis (2000). Local information on breeding bird species is based on Glover (2009). Nomenclature for special-status animal species conforms to the CDFW (2018e,f).

[2] For purposes of this discussion, the term "species" implies all recognized taxa at the species or subspecific level.

[3] On January 1, 2013, the CA Department of Fish and Game (CDFG) changed its name to the CDFW; all publications released prior to that date are referenced by the former name CDFG.

The classification of vegetation types described herein conforms to Sawyer et al. (2009) and, where applicable, Cowardin et al. (1979) and Holland (1986). Special-status plant community designations conform to the CDFW (CNDDB, 2019 and CDFW, 2018b). Information regarding soils was obtained from the web-based database Web Soil Survey[4], operated by the Natural Resources Conservation Service (NRCS; USDA, 2018).

2.3 Special-Status Biological Resources

A literature review was conducted to investigate the potential presence of special-status biological resources within the BSA. Occurrence summaries were obtained from the following sources:

1. Database queries for the Antioch North, Antioch South, Clayton, Rio Vista, Jersey Island, Brentwood, Birds Landing, Denverton, and Honker Bay 7.5-minute USGS quadrangles (CNDDB, 2019; CNPS, 2019; USFWS, 2019).
2. An assessment of habitat types and surrounding land uses completed by reviewing recent aerial photographs.
3. Reconnaissance-level surveys by a qualified biologist.

The presence or potential for occurrence of special-status biological resources within the BSA is based on direct observation or an evaluation of the suitability of existing habitats occurring within the BSA. Suitability is based on familiarity with the specific habitat requirements (i.e., elevation, geology, soil chemistry and type, vegetation communities, microhabitats), geographic distribution, local occurrence records, and the degree of habitat disturbance or alteration. The criteria for assessing the potential for occurrence of special-status species are summarized below.

Species Occurrence Assessment Criteria

None Applied to plant or animal species for which suitable habitat is lacking, which are not known to occur locally, or which are thought to be locally extirpated.

Absent Applied to plant or animal species for which suitable habitat is present but which would have been detectable at the time surveys were conducted.

Not Expected Applied to plant and animal species for which suitable habitat or key habitat elements may be present but which are considered to be of poor quality or are spatially isolated from either known occurrences or areas of suitable habitat. When the existing

[4] Available at http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

habitats within the BSA do not coincide with a species' life history or ecological requirements, its occurrence is not expected.

Possible Applied to plant and animal species for which suitable habitat or key habitat elements are present within the BSA. The occurrence of these species is either considered likely, or, at the least, its presence cannot be ruled out.

Present Applied to plant and animal species that were either observed directly or, in the case of animal species, whose presence can be presumed based on detection of diagnostic sign (i.e. tracks, scat, burrows, carcasses, castings, prey remains, *etc*.).

The conclusions presented in this document are based on a reconnaissance-level survey was performed by biologist Chris Rogers on April 25, 2019. All plant and wildlife observations were recorded, and habitats characterized and mapped.

A delineation of potentially jurisdictional waters of the U.S./waters of the State was not performed, although the limits of the federal and state jurisdictional waters were estimated based on physical indicators of the High Tide Line.

3.0 EXISTING CONDITIONS

3.1 Location and Setting

SFBA intends to construct and operate the proposed Project on a 2.5 acre parcel of land located at 895 East 3rd Street, Pittsburg, California 94565 in Contra Costa County. The Assessor's Parcel Number for the proposed project site is 073-020-019-3. As shown on Figure 1, the parcel is bounded to the north by New York Slough, Suisun Bay, part of the Sacramento-San Joaquin River Delta; to the east by land owned by USS-POSCO Industries (UPI) and by a PG&E substation; to the south by an easement that runs along East 3rd Street; and to the west by Koch Carbon Inc.

The proposed project site was previously host to a 20 megawatt cogeneration power plant, owned and operated by GWF Power Systems Company, Inc. (GWF). The facility was decommissioned in 2012 and the site has since been an empty lot used for truck parking. The proposed project site has a perimeter chain link fence. As shown on Figure 2, two buildings remain in place.

The proposed project site is a paved and gravel lot with several existing buildings. Vegetation is dominated by non-native ruderal (i.e. weedy) plants and landscaping trees. A small easement extends to the shoreline of New York Slough, which supports sparse emergent wetland vegetation in intermittent patches, and armored sections with little or no vegetation. No submerged aquatic vegetation is present along the shoreline. The plant communities and wildlife habitats present in the BSA are described below.

No native soils or land surfaces remain on the site. Underlying geology of the paved project vicinity is assumed to consist of clay soils derived from alluvial deposits, which supported agriculture in the past. These soils are older and more stable than the peat and muck that more recently accreted to form the delta islands to the north of the New York Slough, and throughout the delta. Soils on site are mapped as belonging to the Clear Lake series (USDA, 2018). The Clear Lake series consists of poorly drained soils that, in an undisturbed condition, support annual grasses and forbs and scattered live oaks. These soils are generally deep, with groundwater at about 2 m (80 in). Clear Lake soils are classified as Xeric Endoaquerts.

The New York Slough reach of the San Joaquin River constitutes a prominent hydrologic feature of the project area. At the project site, the river is tidally influenced, with tidal fluctuations of an average of 1.6 m (5.2 ft).

3.2 Plant Communities and Wildlife Habitats

Prior to shoreline development, the project area was upland grassland subsequently used for agriculture or grazing. The shoreline is not a relic of filling of wetlands or mudflats, as has occurred in other areas in the Delta, although river bank maintenance and reinforcements have likely altered the shoreline by restricting the natural recruitment of

native plants wetland and emergent plants. The remaining narrow patches of freshwater emergent marsh vegetation along much of the Pittsburg shoreline are poorly developed and relatively impermanent as the substrate erodes away or is armored.

The existing vegetation on the shoreline, river bank and upland portions of the BSA is characterized by mostly non-native herbs, forbs, shrubs, and trees that are capable of occupying recently or frequently disturbed areas, or have been planted on the project site. Beyond the top of the river bank, the landscape is ruderal or barren as a result of routine maintenance. Vegetation and wildlife habitats in the BSA are summarized below and shown on Figure 3. Tables 1 and 2 list plant and wildlife species observed on the site.

Developed

Developed lands are those from which all natural and non-natural plant assemblages have been removed and replaced by paved or graveled surfaces, structures, equipment storage yards, etc. Few native and non-native animal species are well adapted to developed areas, while others have benefited greatly from urbanization and anthropogenic effects. These species are attracted by certain resources readily available in developed settings such as food, water and shelter while being tolerant of human disturbances such as noise, lighting, and the movement of people and machinery. Many mammals are attracted to human development providing a source of food (e.g., rubbish, garden plants, pet food, and pets).

The majority of the BSA is developed, including concrete pavement and industrial buildings, and a concrete-covered stormwater outfall and discharge pipe that extends into the waters of New York Slough (Figure 3). The above-ground structures are maintained and in use, diminishing their suitability for nesting or roosting wildlife. Nonetheless, certain birds and bats could reside within or on these structures at various times of year. Ornamental landscaping trees also are included within this cover type.

Animal species or their sign[5] detected in developed areas during the present wildlife reconnaissance survey include American crow, California scrub-jay, house finch, mourning dove, and northern mockingbird, turkey vulture, California ground squirrel, and Sierran chorus frog.

Developed areas are not a vegetation type, and are not classified by Sawyer, et al. (2009); they would be classified as upland following Cowardin, et al. (1979). Unless found to support special-status plant or animal species, impacts to developed areas would not typically be regarded as significant pursuant to the statutes and guidelines of CEQA (see discussion in Section 4.1).

[5] Wildlife sign include tracks, vocalization, scat, white-wash, feathers, fur, shed skin, nests, burrows, prey remains, and dead individuals.

Figure 3. Vegetation and Habitat Types

Table 1. Plant Species Observed

Common Name	***Scientific Name***
arroyo willow	*Salix lasiolepis*
* black mustard	*Brassica nigra*
* bull mallow	*Malva nicaeensis*
* bull thistle	*Cirsium vulgare*
coyote brush	*Baccharis pilularis*
* fennel	*Foeniculum vulgare*
floating water primrose	*Ludwigia peploides* ssp. *peploides*
* hare barley	*Hordeum murinum* ssp. *leporinum*
* Himalayan blackberry	*Rubus armeniacus*
* iris	*Iris* sp. (cultivar)
* Italian ryegrass	*Festuca perennis*
* Italian thistle	*Carduus pycnocephala*
* Jersey cudweed	*Pseudognaphalium luteooalbum*
Mason's lilaeopsis	***Lilaeopsis masonii***
* milk thistle	*Silybum marianum*
*perennial pepperweed	*Lepidium latifolium*
* prickly ox-tongue	*Helminthotheca echioides*
* rattail fescue	*Festuca myuros*
redwood	*Sequoia sempervirens* (cultivar)
* red brome	*Bromus rubens*
* red-stem filaree	*Erodium cicutarium*
* river redgum	*Eucalyptus camaldulensis*
saltgrass	*Distichlis spicata*
* slender oat	*Avena barbata*
* smilo grass	*Stipa miliacea*
* stinkwort	*Dittrichia graveolens*
* storksbill	*Geranium dissectum*
* strawberry tree	*Arbutus unedo* (cultivar)
+ Suisun marsh aster	***Symphyotrichum lentum***
* sweet clover	*Melilotus indica*
tule	*Schoenoplectus acutus*
willow herb	*Epilobium ciliatum*
* yellow star thistle	*Centaurea solstitialis*

Notes: Species in **bold** are special status species; see Sections 2.3 and 4.2.
* non-native species; + observed on adjacent property only

Table 2. Wildlife Species or Sign Observed

Common Name	***Scientific Name***
American crow	*Corvus brachyrhynchos*
California scrub-jay	*Aphelocoma californica*
California ground squirrel	*Otospermophilus beecheyi*
house finch	*Haemorhous mexicanus*
mourning dove	*Zenaida macroura*
northern mockingbird	*Mimus polyglottos*
red-tail hawk	*Buteo jamaicensis* (dec.)
Sierran chorus frog	*Pseudacris sierra*
turkey vulture	*Cathartes aura*

Aquatic Habitat

Although tidally influenced, the aquatic habitat of the lower San Joaquin River is predominantly a freshwater environment, especially during the winter months when Delta outflows are around 900 m^3/second (32,000 ft^3/second) (USFWS, 2002). Salt water intrusion occurs during the summer months, making the system somewhat brackish. However, the shoreline vegetation at the stormwater outfall location is indicative of freshwater conditions.

The lower San Joaquin River supports a wide range of wildlife species. A total of 32 fish species have been collected during sampling conducted at the Antioch Dunes National Wildlife Refuge (ADNWR), including the special-status species Delta smelt, longfin smelt, Sacramento splittail, Chinook salmon, steelhead, hardhead (USFWS, 2002). Also known from the project vicinity is Sacramento perch (CNDDB, 2019).

Wildlife known to inhabit the aquatic environment in the project vicinity include such mammals as American beaver, California sea lion common muskrat, harbor seal, and northern river otter, and the reptile species Pacific pond turtle. A wide variety of resident and migratory water fowl are also commonly encountered in the open water habitat of the lower San Joaquin River.

No aquatic animal species or their sign were detected in this habitat during the reconnaissance survey.

Aquatic habitat is not classified by Sawyer, et al. (2009). However, impacts to open waters are regulated under federal, State or local laws and policies and be considered significant pursuant to the statutes and guidelines of CEQA (see discussion in Section 4.1).

Littoral Zone

The littoral zone is the near-shore environment of seas, lakes or rivers. In areas subject to tidal action, it extends from the high water mark, which is only briefly inundated, to the shoreline, which is permanently submerged. It includes the intertidal zone. In freshwater ecosystems, the littoral zone occurs on the edge of large lakes and rivers, often with extensive areas of wetland. The littoral zone may form a narrow or broad fringing wetland, with extensive areas of aquatic plants sorted by their tolerance to different water depths. Typically, four zones are recognized, from higher to lower on the shore: wooded wetland, wet meadow, marsh and aquatic vegetation. The littoral zone of freshwater ecosystems is among the most ecologically significant on earth. Due to their high physical complexity and connectivity, the littoral zone supports especially high biodiversity.

The littoral zone is an important interface between terrestrial and aquatic ecosystems. It is the warmest of the aquatic systems since it is shallow and can absorb more of the sun's heat. It sustains a fairly diverse community, which can include several species of algae (like diatoms), rooted and floating aquatic plants, grazing snails, clams, insects, crustaceans, fishes, and amphibians. The vegetation and animals living in the littoral zone are food for other creatures such as turtles, snakes, and ducks. Many vertebrates and invertebrates use both the littoral zone as well as the terrestrial ecosystem for food and habitat.

There are three categories of plants that may occur in the littoral zone of freshwater ecosystems. Emergent plants are those that are rooted in the subsurface substrate but have leaves and stems that float at the surface or grow above the surface, such as cattails and tules. Floating plants are broad, flat-leaved plants that are not rooted in the subsurface substrate, such as duckweed and water hyacinth. Submersed plants are those that grow completely beneath the surface such as pondweed and water milfoil.

In the BSA, the littoral zone is very narrow to absent due to the steepness and armoring of the river bank around the outfall. Additionally, the BSA encompasses only 25 linear feet of shoreline frontage on New York Slough. Within the BSA, the littoral zone is mostly unvegetated, but supports very small patches of tule and the special-status species Mason's lilaeopsis (see discussion in Section 4.2, below). The floating-leaved plant, floating water primrose, also was present on the littoral shore.

Wildlife known to inhabit the littoral zone of the Sacramento - San Joaquin Delta include such mammals as American beaver, common muskrat, and northern river otter, and the reptile species Pacific pond turtle. A wide variety of resident and migratory water fowl are also commonly encountered in the open water habitat of the lower San Joaquin River.

No animal species or their sign were detected in this habitat during the reconnaissance survey.

Vegetation in the littoral zone on site does not conform to any particular natural association described in Sawyer et al. (2009), but are composed of plant species that respond to changes in shoreline conditions, annual floods, and daily tidal cycles. This vegetation is classified as "palustrine emergent persistent seasonally flooded/saturated freshwater wetlands" (P-EM1-E0) following Cowardin, et al. (1979). Impacts to this plant community qualifying as wetlands may be regulated under federal, State or local laws and policies and would be considered significant pursuant to the statutes and guidelines of CEQA (see discussion in Section 4.1).

Ruderal Uplands

Ruderal habitat is that from which the native vegetation has been completely removed by grading, cultivation, or other surface disturbances. Left undeveloped, such areas may become recolonized by invasive non-native as well as native plant species. Ruderal sites are typically dominated by herbaceous species, although scattered woody shrubs and trees may also begin to appear over time. Ruderal sites are characteristic of road sides, fallow agricultural fields, industrial or vacant lots, and landslides.

From a wildlife perspective, ruderal habitat includes those habitats in which the native vegetation has been completely removed by grading, cultivation, or other surface disturbances. Vegetative cover is typically sparse, consisting of herbaceous "weeds", scattered shrubs, and occasional trees. Due to the relative openness of the landscape and the high level of human activity, ruderal sites typically provide little habitat for wildlife species.

Wildlife species commonly encountered in ruderal habitats include reptiles such as southern alligator lizard, northern alligator lizard, and western fence lizard. Passerines (perching birds) that may forage on disturbed ground or among the scattered trees and shrubs include Brewer's blackbird, European starling, house finch, mourning dove, northern mockingbird, and western scrub-jay, among others. Fossorial (i.e., burrowing) mammals such as Botta's pocket gopher and California ground squirrel are also expected, along with other rodents such as brush rabbit, California vole, and deer mouse. California ground squirrel burrows were observed in the ruderal portions of the site. Other mammals that are naturally tolerant of human habitation and activities include mule deer, raccoon, striped skunk, and Virginia opossum.

Historically, the vicinity of the BSA supported grasslands (Stanford et al., 2011). However, these lands have long been subjected to intensive agricultural and industrial uses significantly altering the natural vegetation of the area. The site is currently paved over 95% of the total area. Several patches of unpaved ground support sparse to relatively dense patches of weedy annual grasses and forbs. Additionally, weeds are growing from cracks and joints in the paved areas. The most prevalent plant species in the ruderal areas include black mustard, bull mallow, fennel, foxtail barley, rattail fescue, slender oats, willow herb, and yellow sweetclover.

Ruderal habitat is not specifically described by Sawyer, et al. (2009); it would be classified as upland following Cowardin, et al. (1979). As a non-native plant association, ruderal habitat has no global or State rarity ranking. Unless found to support special-status plant or animal species, or as otherwise regulated features such as drainages or water bodies, impacts to ruderal habitat would not be regarded as significant pursuant to statutes and guidelines of CEQA (see discussion in Section 4.1).

3.3 Wildlife Movement Corridors

Under CEQA, project impacts are considered significant if they would interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites. Wildlife corridors (i.e., linear habitats that naturally connect and provide passage between two or more large habitats or habitat fragments) are important for persistence of wildlife over time. Wildlife must have access to adequate resources, and corridors are used to find suitable forage, nesting and resting sites, mates and new home ranges. In addition, corridors for dispersal within breeding populations will decrease the likelihood that subpopulations will go extinct or become locally extirpated. Even where patches of pristine habitat are fragmented, as commonly occurs with riparian vegetation, wildlife movement between populations is facilitated through habitat linkages, migration corridors and movement corridors.

Wildlife movement includes migration (i.e., usually one direction per season), inter-population movement (i.e., long-term genetic exchange) and small travel pathways (i.e., daily movement within an animal's home range). Daily movement patterns define an animal's home range where activities such as foraging, resting and conspecific (i.e., individuals of the same species) interactions occur. Generally, longer movements usually by dispersing individuals connect breeding populations, permitting gene flow between these subpopulations. Functional corridors must generally provide adequate habitat cover to permit animal dispersal between areas large enough to serve as home ranges. Corridor requirements vary between organisms; a suitable corridor for a butterfly or bird may be a series of "stepping stones" of suitable habitat, while a terrestrial vertebrate may need a continuous band of suitable habitat for successful movement. Habitat loss, fragmentation, and degradation resulting from a change in land use or habitat conversion can alter the use and viability of corridors.

The aquatic habitat of New York Slough and the shoreline of the subject property may be considered wildlife movement corridors. Although over-land movement is restricted by fencing, barren ground, and moderately intense human disturbance in the form of vehicles, pedestrians, lighting and noise, the shoreline is somewhat protected from these limitations. Vegetation on the river bank provides cover for dispersing wildlife, forming a corridor between more extensive areas of undeveloped, natural habitats. Open water also facilitates the movement of numerous aquatic species such as mountain beaver, common

muskrat and northern river otter. The San Joaquin River serves as an important corridor for resident and anadromous fish.

Nonetheless, project implementation is not expected to interfere substantially with the local or regional movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; impacts would not be considered significant pursuant to CEQA guidelines.

4.0 SPECIAL-STATUS BIOLOGICAL RESOURCES

Certain natural plant communities, wildlife habitats and landscape features are considered to have special-status due to their restricted occurrence in the State, their tendency to support special-status plant or animal species, or because impacts are restricted or otherwise regulated under federal, State, or local laws or ordinances. These are discussed below.

4.1 Special-Status Natural Communities, Habitats and Landscape Features

Special-Status Natural Communities

Special-status natural communities are those that are considered rare in the region, support special-status plant or animal species, or receive regulatory protection under the Clean Water Act (CWA), Lake and Streambed Alteration Program (LSAP), and/or the Porter-Cologne Water Quality Control Act (PCWQCA). A number of communities have been designated as rare and these communities are given the highest inventory priority (CNDDB, 2019; CDFW, 2018b). Vegetation alliances given a rarity ranking of G1/S1, G2/S2 or G3/S3 are considered to be of high inventory priority by the CNDDB; impacts may therefore be considered significant pursuant to statutes and guidelines of CEQA. Alliances ranked as G4/S4 or G5/S5 are generally considered common and impacts would not normally be considered as significant (for a definition of rarity rankings, see Attachment D).

Wetland and riparian habitats are considered by federal and State regulatory agencies to represent a sensitive and declining resource. Wetland and riparian habitats can serve significant biological functions by providing nesting, breeding, foraging, and spawning habitat for a wide variety of resident and migratory animal species.

Special-status natural communities recorded from the project region include Alkali Meadow, Alkali Seep, Cismontane Alkali Marsh, Coastal and Valley Freshwater Marsh, Coastal Brackish Marsh, Northern Claypan Vernal Pool, Serpentine Bunchgrass Grassland, Stabilized Interior Dunes, and Valley Needlegrass Grassland (CNDDB, 2019). None of these special-status natural communities are present within the project footprint and none would be impacted by the proposed project.

Small, fringing patches of freshwater emergent marsh are present along the shoreline near the BSA. This vegetation occurs in a narrow band, averaging 0.6 – 1.8 m (2 – 6 ft) in width. It does not conform to the any described special-status natural community, but does constitute jurisdictional wetlands. Impacts resulting from project implementation would be deemed significant pursuant to the statutes and guidelines of CEQA. Impact avoidance

measures are recommended to be included as part of the proposed project, as outlined in Section 5.1, below.

Eelgrass Habitat

In the subtidal zone, impacts to eelgrass habitat are regulated under the CWA, Magnuson-Stevens Fishery Conservation and Management Act (MSA), the California Coastal Act (CCA), and the California Code of Regulations (CCR)[6]. According to these laws and regulations, any activities which may potentially impact eelgrass habitat must mitigate for those impacts. This requires mitigation for harmful impacts to existing eelgrass beds as well as potential eelgrass habitat.

The presence of eelgrass beds is not expected at the project location; it has been determined that eelgrass has been fully replaced by the native species widgeon grass east of the Carquinez Bridge (Merkel & Associates Inc., 2004). Furthermore, the proposed project would not result in any changes to the aquatic environment of New York Slough that would affect eelgrass.

Essential Fish Habitat

The maintenance of healthy fisheries is dependent on the protection of those habitats essential for the growth and reproduction of fish species. The NMFS and regional fishery management councils are charged with ensuring that fishing activities have a minimal impact on fish habitat. Essential fish habitat (EFH) includes those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity.[7] While private landowners and state agencies are not required to consult with NMFS, pursuant to the MSA, a consultation is required[8] if each of the following factors is satisfied:

1. The federal government has authorized, funded, or undertaken part or all of a proposed activity. For example, if a project proposed by a federal or state agency or an individual requires a federal permit, then the federal agency authorizing the project through the issuance of a permit must consult with NMFS.

2. The action will "adversely" affect EFH. An adverse effect is defined as any impact that reduces quality and/or quantity of EFH. This includes direct or indirect physical, chemical, or biological alterations of the waters or substrate and loss of, or injury to species and their habitat, and other ecosystem components, or reduction of the quality and/or quantity of EFH. Adverse effects may result from actions occurring within EFH or outside of EFH.

[6] CCR Title 14
[7] 16 USC 1802(10)
[8] MSA § 305(b)(2)

The project area is located within EFH for Pacific Groundfish.

Groundfish are fish that live in, on, or near the bottom of the water body they inhabit. They occur in the ocean and bays, including the upriver extent of saltwater intrusion in estuaries. Over 80 groundfish species are covered under the Pacific Groundfish Fishery Management Plan (FMP), including 64 species of rockfish, 12 species of flatfish, six species of roundfish, six species of sharks and skates, and others. At least 31 groundfish species inhabit estuaries and nearshore kelp forests during part or all of their life cycle (NMFS, 2005a). Several groundfish species covered under the Pacific Coast Groundfish FMP have distributions in Suisun Bay, and have the potential to occur in the project area as juveniles and/or adults. Starry flounder is the only species that may be abundant in Suisun Bay. All life stages may occur in the project vicinity.[9] As designated by NOAA, Essential Fish Habitat (EFH) means those waters and substrate that are essential to fish for spawning, breeding, feeding, and growing to maturity.

Because the proposed project does not include any work within the aquatic environment, and discharges through the outfall would be within permitted parameters, there is no potential for adverse effects on EFH.

Critical Habitat

Critical habitat is a term defined under FESA[10] as (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of this Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 4 of this Act, upon a determination by the Secretary that such areas are essential for the conservation of the species.

Critical habitat designations affect only federal agency actions or federally funded or permitted activities. Critical habitat designations do not affect activities by private landowners if there is no federal "nexus"—that is, no federal funding or authorization. Federal agencies are required to avoid "destruction" or "adverse modification" of designated critical habitat. Most activities that require consultation by federal agencies proceed without modification. In areas where the species is not present, some project modifications that would not have occurred without the critical habitat designation may be required.

Based on a review of CNDDB (2019), the project site is located within designated critical habitat for Delta smelt and spring-run Chinook (see discussion under Section 4.3, below).

[9] NOAA EFH Mapper, available online at https://www.habitat.noaa.gov/protection/efh/efhmapper/
[10] FESA § 2(5)

However, because the proposed project does not include any work within the aquatic environment, and discharges through the outfall would be within permitted parameters, there is no potential for adverse effects on critical habitat.

Waters of the U.S. / Waters of the State

Certain habitat and site features fall under federal and state jurisdiction (see discussion of Special-Status Natural Communities in Section 4.1, below). These typically include stream and drainage courses, water bodies, tidal lands, wetlands, and riparian habitats. The extent of jurisdiction of a given agency varies and is defined by specific guidelines issued by each agency.

Wetlands belong to the broad category of Waters of the U.S. and are defined as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions".[11] Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands are areas of land which are permanently or seasonally wet and support vegetation specifically adapted to growing in saturated soils under conditions of low oxygen. Wetlands are considered valuable to humans because they provide flood protection, recharge ground water supplies, improve water quality by filtering out pollutants and sediments, protect shorelines and stream banks from erosion, serve as important spawning and nursery areas for invertebrates, fish, shellfish and birds, provide recreation, open space, and aesthetic values, provide water and sanctuaries for wildlife, and frequently support endangered, threatened, or rare species of wildlife and plants. The value of a particular wetland is assessed based on its size, proximity to open areas supporting a variety of other habitat types, its level of disturbance, the presence of invasive plant species, exposure to human activities that might disrupt wildlife movements or breeding, exposure to pollutants, or other conditions affecting the wetlands functions listed above.

To meet the legal definition of a wetland, a site must exhibit specific indicators of hydrologic, soil, and vegetation parameters. Indicators of all three wetlands parameters must be present for a site to be classified as a wetland (Environmental Laboratory, 1987). Although emergent wetlands occur in the BSA, no wetlands are present directly opposite of the existing wharf; no significant direct or indirect impacts on wetlands would result from project implementation.

As summarized by the U.S. Army Corps of Engineers (USACE) and U.S. Environmental Protection Agency (USEPA), both agencies assert jurisdiction over “non-navigable tributaries of traditional navigable waters that are relatively permanent where the tributaries typically flow year-round or have continuous flow at least seasonally (e.g., typically three months)” and “wetlands that abut such tributaries” (USEPA/USACE,

[11] 40 CFR 230.3[t]

2008). The extent of USACE jurisdiction in tidal waters normally corresponds to the Mean High Water[12], which was observed in the field to correspond with the upper limit of wetland vegetation.

The project site would not involve the placement of fill below the HTL of the San Joaquin River, a traditional navigable Waters of the U.S.[13] and a Waters of the State[14], nor would it cause any changes that affected navigability, Therefore, the proposed project would not be regulated pursuant to the CWA[15] under the jurisdiction of the USACE and RWQCB and the Rivers and Harbors Act of 1899 (RHA)[16] (USACE). Impacts below the top of bank are regulated as waters of the state by the CFGC[17] and RWQCB. Similarly, the project does not require authorization from these agencies with regard to waters of the state.

Impact avoidance measures recommended to be included as part of the proposed project are outlined in Section 5.1.

[12] High Tide Line is defined at 33 CFR 328.3 as "the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. The high tide line may be determined, in the absence of actual data, by a line of oil or scum along shore objects, a more or less continuous deposit of fine shell or debris on the foreshore or berm, other physical markings or characteristics, vegetation lines, tidal gages, or other suitable means that delineate the general height reached by a rising tide. The line encompasses spring high tides and other high tides that occur with periodic frequency but does not include storm surges in which there is a departure from the normal or predicted reach of the tide due to the piling up of water against a coast by strong winds such as those accompanying a hurricane or other intense storm."

[13] As defined in 40 CFR § 230.3(s), Waters of the U.S. include:

- All waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters that are subject to the ebb and flow of tide;
- All interstate waters, including interstate wetlands;
- All other waters, such as interstate lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, prairie potholes, vernal pools, wet meadows, playa lakes, or natural ponds, the use, degradation, or destruction of which could affect interstate or foreign commerce;
- Tributaries of the above;
- Territorial seas; and
- Wetlands adjacent to waters defined above.
- Although isolated wetlands no longer fall under USACE jurisdiction, impacts to isolated wetlands continue to be regulated under State law (see below).

[14] As defined under California Water Code § 13050(e), Waters of the State are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state". These include nearly every surface or ground water in California, or tributaries thereto, and include drainage features outside USACE jurisdiction (e.g., dry and ephemeral/seasonal stream beds and channels, etc.), isolated wetlands (e.g., vernal pools, seeps, springs and other groundwater-supplied wetlands, etc.), and storm drains and flood control channels.

[15] CWA § 401

[16] RHA § 10

[17] CFGC § 1602

4.2 Special-Status Plant Species

Special-status plant species include all plant species that meet one or more of the following criteria:[18]

- Listed or proposed for listing as Threatened or Endangered under the federal Endangered Species Act (FESA) or candidates for possible future listing as Threatened or Endangered under the FESA.[19]
- Listed[20] or candidates for listing by the State of California as Threatened or Endangered under the California Endangered Species Act (CESA).[21] A species, subspecies, or variety of plant is **endangered** when the prospects of its survival and reproduction in the wild are in immediate jeopardy from one or more causes, including loss of habitat, change in habitat, over-exploitation, predation, competition, disease, or other factors.[22] A plant is **threatened** when it is likely to become endangered in the foreseeable future in the absence of special protection and management measures.[23]
- Listed as Rare under the California Native Plant Protection Act (CNPPA).[24] A plant is **Rare** when, although not presently threatened with extinction, the species, subspecies, or variety is found in such small numbers throughout its range that it may be endangered if its environment worsens.[25]
- Meet the definition of Rare or Endangered under CEQA.[26] Species that may meet the definition of Rare or Endangered include the following:
  - Species considered to be "rare, threatened or endangered in California" (CRPR 1A, 1B and 2);
  - Species that may warrant consideration on the basis of local significance or recent biological information;
  - Some species included on the California Natural Diversity Database's (CNDDB) *Special Plants, Bryophytes, and Lichens List*.
- **Locally significant species,** that is, a species that is not rare from a statewide perspective but is rare or uncommon in a local context such as

[18] This definition is provided in CDFG (2009).
[19] 50 CFR §17.12
[20] Refer to current online published lists available at: http://www.dfg.ca.gov/biogeodata.
[21] CFGC § 2050 et seq.
[22] CFGC § 2062
[23] CFGC § 2067
[24] CFGC § 1900, et seq.
[25] CFGC § 1901
[26] CEQA § 15380[b] and [d]

within a county or region[27] or is so designated in local or regional plans, policies, or ordinances (CEQA Guidelines[28]). Examples include a species at the outer limits of its known range or a species occurring on an uncommon soil type.

In addition, plant species have been assigned global and State rarity rankings (for a definition of these rankings, see Attachment D). Species ranked as S1, S2, or S3 are considered to be critically imperiled, imperiled or vulnerable to extinction within the boundaries of the State (CDFW, 2018c). As such, these species may be considered to meet the criteria for listing as endangered, threatened or rare under CESA.[29] Species ranked as S4 or S5 are generally considered common enough to be secure and not at risk of extinction. Impacts on special-status plants species, as thusly defined, would be regarded as significant pursuant to CEQA[30] and should be addressed in environmental review documents.[31]

A total of 81 special-status plant species have been recorded from the nine 7.5-minute USGS quadrangles including and surrounding the BSA (CNPS, 2019; CNDDB, 2019; USFWS, 2019). A total of 8 special-status plant species have been recorded from within a 4.8 km (3 mi) radius of the BSA; all eight of these have been recorded from within 1.6 km (1 mi) of the BSA (Figure 4).

One State-listed rare plant species, Mason's lilaeopsis, is present in the BSA at the mouth of the stormwater outfall (Figure 5). This species is described in detail below. No Federal listed, Proposed, or Candidate plant species are considered to have potential to occur in the BSA. Marginal habitat exists for one non-listed rare plant, Suisun marsh aster, which has been observed within 30 ft of the stormwater outfall on the adjacent property to the west (C. Rogers, pers. obs.), but does not occur on the subject property.

[27] CEQA § 15125 (c)
[28] CEQA Appendix G
[29] CEQA § 15380(d)
[30] CEQA § 15065
[31] CEQA § 15125

Figure 4. Special-Status Plant Records from the Project Vicinity

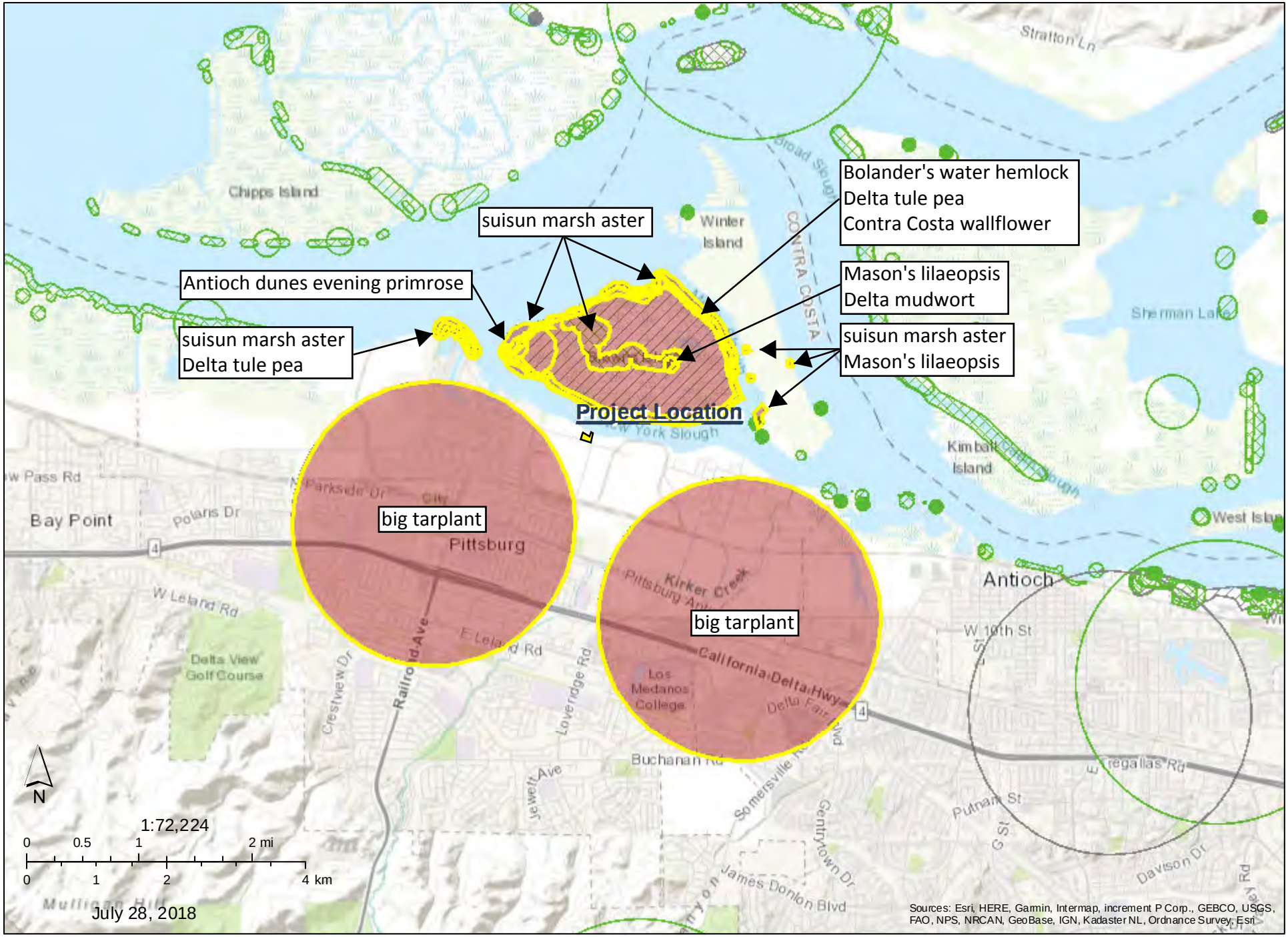


Figure 5. Location of Mason's lilaeopsis and Suisun marsh aster

A total of 70 special-status species in the database queries are considered to have no potential for occurrence at the project site due to a lack of suitable habitat, lack of suitable soils, and distance of the BSA from known occurrences. Another five of the target species are considered absent from the project site because they would have been detectable during the present survey. Another five of the target species are not expected to occur on site because the habitat is of very poor quality and highly altered, or due because the project site is spatially isolated from either known occurrences or areas of suitable habitat. No impact avoidance, minimization or mitigation measures are warranted and no further surveys or analysis related to this group of special-status plant species are necessary.

Attachment B is a list of all special-status plant species evaluated as part of this analysis. An explanation of all rarity status codes is provided in Attachment D. The following discussions provide details on species with at least marginally suitable habitat in the BSA.

Suisun Marsh Aster

Regulatory Status: Federal: none; State: none; CRPR: 1B.2. It has been assigned a global and state ranking of G2/S2; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018c). As such, this species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to the CEQA. Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Suisun Marsh aster (*Symphyotrichum lentum*) is a perennial, rhizomatous herb belonging to the sunflower family (Asteraceae). It produces stems up to 16 m (5 ft) tall, with sessile basal and cauline leaves up to 15 cm (6 in) long. Flowers are violet and occur in heads at the tips of branches. Flowering occurs May through November. Suisun marsh aster is a native species endemic to California and found only in Contra Costa, Napa, Sacramento, San Joaquin and Solano counties. It is associated with in freshwater and brackish marshes around Suisun Bay, growing from sea level to 3 m (0-10 ft) in elevation.

Critical Habitat: Suisun marsh aster is not listed under FESA; as such, no critical habitat has been designated for the species.

Habitat Suitability and Potential to Occur: Suitable habitat for Suisun marsh aster is present within the littoral zone of the BSA. There are 21 records of Suisun marsh aster within an 8 km (5 mi) radius of the project site (CNDDB, 2019)which includes records from the shoreline to the north and east of the project site. Suisun marsh aster was documented during a 2018 survey of the adjacent property to the west; the nearest plants to the BSA were approximately 30 ft to the west. It appears to persist in unarmored sections of shoreline with natural substrates.

Potential Project-Related Effects: Suisun marsh aster is not present in the BSA, and nearby populations would not be affected directly or indirectly by the proposed project. Marginally suitable habitat exists along the shoreline, but the shoreline is already armored around the outfall, which appears to limit the occurrence of this species. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to shoreline habitat. However, because of the proximity of this species to the project site, impact avoidance measures are recommended to be included as part of the proposed project, as described in Section 5.2, below.

Bolander's Water Hemlock

Regulatory Status: Federal: none; State: none; CRPR: 2B.1. It has been assigned a global and state ranking of G5T4/S2; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018c). As such, this species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to the CEQA. Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Description: Bolander's water hemlock (*Cicuta maculata* var. *bolanderi*) is a perennial member of the carrot family (Apiaceae). It produces erect hollow stems with pinnately compound leaves and serrate leaflets. Inflorescences are umbellate, with clusters of small white flowers. Flowering occurs July through September. Bolander's water hemlock occurs in coastal salt and freshwater marshes. It has been recorded from coastal regions of Contra Costa, Los Angeles, Marin, Sacramento, Santa Barbara, San Luis Obispo, and Solano counties.

Critical Habitat: Bolander's water hemlock is not listed under FESA; as such, Critical Habitat has not been designated for the species.

Habitat Suitability and Potential to Occur: The BSA supports marginally suitable shoreline habitat for the species, though lacks the well-developed tidal marsh with which it is usually associated. However, the species is not expected on site as this large perennial species would have been detectable during the present survey.

Two occurrences of Bolander's water hemlock have been recorded within 5 km (3 mi) of the project site. The nearest record (Occ. # 2) is a 1978 observation on Browns Island across New York Slough from the BSA, and is presumed extant. The tidal marsh on Browns Island is well-developed and intact, with unarmored shorelines, as contrasted to the southern shoreline of New York Slough and the BSA.

Potential Project-Related Effects: Although there is marginally suitable habitat for the species within the BSA, it was not observed and is considered absent. It is a large plant with distinctive leaves, recognizable when not yet in flower. No project-related activities would affect this species; therefore project implementation would have no potential for impacting this species. Impact avoidance, minimization or mitigation measures are not warranted.

Delta Tule Pea

Regulatory Status: Federal: none; State: none; CRPR: List 1B.2. It has been assigned a global and state ranking of G5T2/S2; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018c). As such, this species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to the CEQA. Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Delta tule pea (*Lathyrus jepsonii* var. *jepsonii*) is a robust perennial vine belonging to the pea family. It has winged stems reaching 2.4 m (8 ft) in length and climbs by tendrils located at the tips of the leaves. The leaves are 2.5-5 cm (1-2 in) long and have 10-16 leaflets. Flowers are bright pink to purple, to 2.5 cm (1 in) long, and are produced May through June. Delta tule pea is a native species endemic to California and found only in Contra Costa, Napa, Sacramento, San Joaquin Solano, Sonoma and Yolo counties. It is associated with in freshwater and brackish marshes around Suisun Bay, growing from sea level to 4 m (0-13 ft) in elevation.

Critical Habitat: Delta tule pea is not listed under FESA; as such, no critical habitat has been designated for the species.

Habitat Suitability and Potential to Occur: Marginally suitable habitat for Delta tule pea is present within the littoral zone of the BSA. There are 12 records of Delta tule pea within an 8 km (5 mi) radius of the project site (CNDDB, 2019); it has been recorded from Browns Island across New York Slough from the project site. Habitat conditions on Browns Island are typical for this species, and differ from the project site, with relatively intact stands of dense brackish tidal wetlands on the margins and interior of the island. No individuals were detected within the BSA.

Potential Project-Related Effects: Marginally suitable habitat for the Delta tule pea is present in the BSA. This species typically occurs in well-developed marsh habitat where there is a prevalence of other tall vegetation that it uses for support. Marsh vegetation along the shoreline of the BSA is very sparse and inconsistent with conditions where the species is observed nearby. Project implementation is would not

have any direct or indirect effects on the species. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to shoreline habitat. Impact avoidance measures or mitigation measures are not warranted for this species.

Mason's Lilaeopsis

Regulatory Status: Federal: None; State: Rare; CRPR: List 1B.1. It has been assigned a global and state ranking of G2/S2; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018c). As such, the species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to CEQA. Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Mason's lilaeopsis (*Lilaeopsis masonii*) is a diminutive member of the carrot family (Apiaceae). It is a prostrate perennial producing rhizomes and linear, cylindric to flattened leaves 1.3-7.6 cm (0.5-3 in) long. Flowers are white to maroon, 1 mm (0.04 in) long at the end of basal peduncles 2-20 mm (0.08-0.8 in) long. Flowering occurs June through August. Mason's lilaeopsis is a native species endemic to California and is found only in Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Solano and Yolo counties. It forms dense to sparse colonies on exposed muddy streambanks and levees associated with freshwater and intertidal marshes of the Napa, Sacramento and San Joaquin rivers and the Point Reyes Peninsula, growing from sea level to 10 m (0-33 ft) in elevation.

Critical Habitat: Critical habitat has not been designated for Mason's lilaeopsis.

Habitat Suitability and Potential to Occur: A small patch of Mason's lilaeopsis occurs within the BSA, on fine sediments accumulated in riprap at the mouth of the stormwater outfall (see Figure 5, and photographs 4 and 5 in Attachment A). The total area is approximately 3 ft^2. Marginally suitable habitat for Mason's lilaeopsis is present within the littoral zone of the BSA, but was not otherwise present. There are 12 records of Mason's lilaeopsis within an 8 km (5 mi) radius of the project site (CNDDB, 2019); it has been recorded from the Browns Island due north of the project site, in relatively undisturbed habitat on the unarmored shoreline.

Potential Project-Related Effects: Although Mason's lilaeopsis is present in the BSA, it occurs at the mouth of a stormwater outfall that is currently in use (i.e. it discharges runoff from the site during storm events). This use would not change with implementation of the proposed project, therefore any changes to the small population of Mason's lilaeopsis would not be attributable to the project. However,

because of the presence of the species within the project area, impact avoidance measures are recommended as part of the proposed project, as outlined in Section 5.3, below.

Delta Mudwort

Regulatory Status: Federal/State: None; CRPR: List 2B.1. It has been assigned a global and state ranking of G4G5/S2; species assigned a ranking of S2 species assigned a ranking of S2 are considered imperiled in the state due to its very restricted range, very few populations, or other factors making it very vulnerable to extirpation (CDFW, 2014c). As such, the species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to the CEQA. Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Delta mudwort (*Limosella australis*) is a tufted annual belonging to the figwort family (Scrophulariaceae). It produces green, linear awl-like to cylindrical leaves cm (0.5-1.5 in) long. Flowers are white to lavender-blue, 3 mm (0.12 in) long and develop May through August. Delta mudwort has been regarded as a rare native species in California, although recent treatments indicate that it may actually have been accidentally imported in the ballast of ships from the east coast of North America. Here, it is found in the San Joaquin-Sacramento River Delta, occurring in Contra Costa, Sacramento, San Joaquin, and Solano counties. It has also been recorded from Marin County (Abbot's Lagoon). It is found on exposed muddy or sandy intertidal flats and brackish marshes, growing from sea level to 3 m (0-10 ft) in elevation.

Critical Habitat: Delta mudwort is not listed under FESA; as such, no critical habitat has been designated for the species.

Habitat Suitability and Potential to Occur: Marginally suitable habitat for Delta mudwort is present within the littoral zone of the BSA. There are ten records of Delta mudwort within an 8 km (5 mi) radius of the project site (CNDDB, 2019); it has been recorded from the interior of Browns Island, across New York slough from the BSA, and from the Dow Wetlands Preserve 3.2 km (2 mi) to the east. The species is not present within the small shoreline area within the BSA.

Potential Project-Related Effects: Marginally suitable habitat for Delta mudwort is present in the BSA, but is considered to be unlikely to occur on site. Project implementation is would not have any direct or indirect effects on the species. Impact avoidance measures are not warranted for this species.

Eel-Grass Pondweed

Regulatory Status: Federal: None; State: Rare; CRPR: List 2B.2. It has been assigned a global and state ranking of G4G5/S3; species assigned a ranking of S3 are considered vulnerable in the state due to their restricted range, relatively few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018c). As such, the species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to the CEQA. Impacts to species with such a ranking may be regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Eel-grass pondweed (*Potamogeton zosteriformis*) is an annual aquatic herb belonging to the pondweed family (Potamogetonaceae). It produces submerged linear leaves 5-20 cm (2-8 in) long, 2-5 mm (0.08-0.2 in) wide on flat to winged stems. Flowers are greenish and clustered at the ends of peduncles 2-6 cm (0.8-204 in) long. Flowering occurs June through July. Eel-grass pondweed is a native species but is not endemic to California. It is found only in Contra Costa, Lake, Lassen, Modoc and Shasta counties as well as through the western and mid-western states. It grows in muddy soil of ponds, lakes and streams, growing from sea level to 1300 m (0-4264 ft) in elevation.

Critical Habitat: Eel-grass pondweed is not listed under FESA; as such, no critical habitat has been designated for the species.

Habitat Suitability and Potential to Occur: Marginally suitable habitat for eel-grass pondweed is present in the subtidal zone of the BSA. A focused survey for this diminutive, difficult to find species was beyond the scope of this effort. Eel-grass pondweed has not been recorded from within an 8 km (5 mi) radius of the project site (CNDDB, 2019). As described in Section 4.1, eelgrass has been fully replaced by the native species widgeon grass east of the Carquinez Bridge (Merkel & Associates Inc., 2004). Therefore, it is not expected to occur on site.

Potential Project-Related Effects: Although marginally suitable habitat for eel-grass pondweed is present in the BSA, it is not expected to occur on site because it is outside of the known range of the species, and because the rapidly deepening bathymetry of New York Slough is not conducive to its establishment or persistence. Project implementation would not have any direct or indirect effects on the species. Impact avoidance, minimization or mitigation measures are not warranted.

Slender-Leaved Pondweed

Regulatory Status: FESA: none; CESA: none; CRPR: 2B.2; Global/State rarity ranking: G5T2/S3

Description: Slender-leaved pondweed (*Stuckenia filiformis* ssp. *alpina;* formerly *Potamogeton filiformis*) is a rhizomatous aquatic herb belonging to the pondweed family (Potamogetonaceae). This completely aquatic herb produces long, sessile leaves from a tuber buried in the submersed substrate. It produces inconspicuous flowers on submerged spikes. Flowering occurs May through July. Slender-leaved pondweed occurs in shallow freshwater marshes and swamps below 2135 m (7000 ft) in elevation.

Critical Habitat: Critical Habitat has not been designated for slender-leaved tarplant.

Habitat Suitability and Potential to Occur: Slender-leaved pondweed has been recorded within 1.25 km (0.8 mi) of the BSA, off the northwest shore of Browns Island[32]. Habitat conditions within New York Slough, with its rapidly deepening bathymetry and relatively swift tidal currents, differ substantially from the typical occurrence of this species.

Suitable habitat for slender-leaved pondweed is present on the subject parcel. Because this annual species would not have been detectable during the present survey, its presence cannot be ruled out.

Potential Project-Related Effects: Although marginally suitable habitat for eel-grass pondweed is present in the BSA, it is not expected to occur because habitat conditions are not consistent with where it is observed. Project implementation would not have any direct or indirect effects on the species. Impact avoidance, minimization or mitigation measures are not warranted.

4.3 Special-Status Animal Species

Special-status animal species include listed as Endangered, Threatened, Rare, or as Candidates for listing under the FESA (USFWS, 2018) or CESA (CDFW, 2018f). Other species regarded as having special-status include special animals, as listed by the CDFW (2018e). Additional bird species receive protection under the Bald and Golden Eagle Protection Act (BGEPA)[33], the Migratory Bird Treaty Act (MBTA)[34] and the Migratory Bird Treaty Reform Act (MBTRA)[35]. The USFWS maintains a list of bird species of conservation concern (BCC) which includes species of migratory nongame birds that could become candidates for listing under FESA (USFWS, 2008). The California Fish and Game Code (CFGC) provides specific language protecting birds and raptors[36], "fully protected birds"[37], "fully protected mammals"[38], "fully protected reptiles and

[32] http://online.sfsu.edu/katboyer/Boyer_Lab/Pondweeds!_files/BrownsWinter.pdf
[33] 16 USC 668
[34] 16 USC 703-711
[35] 70 FR 12710
[36] §§ 3503 and 3503.5
[37] CFGC § 3511

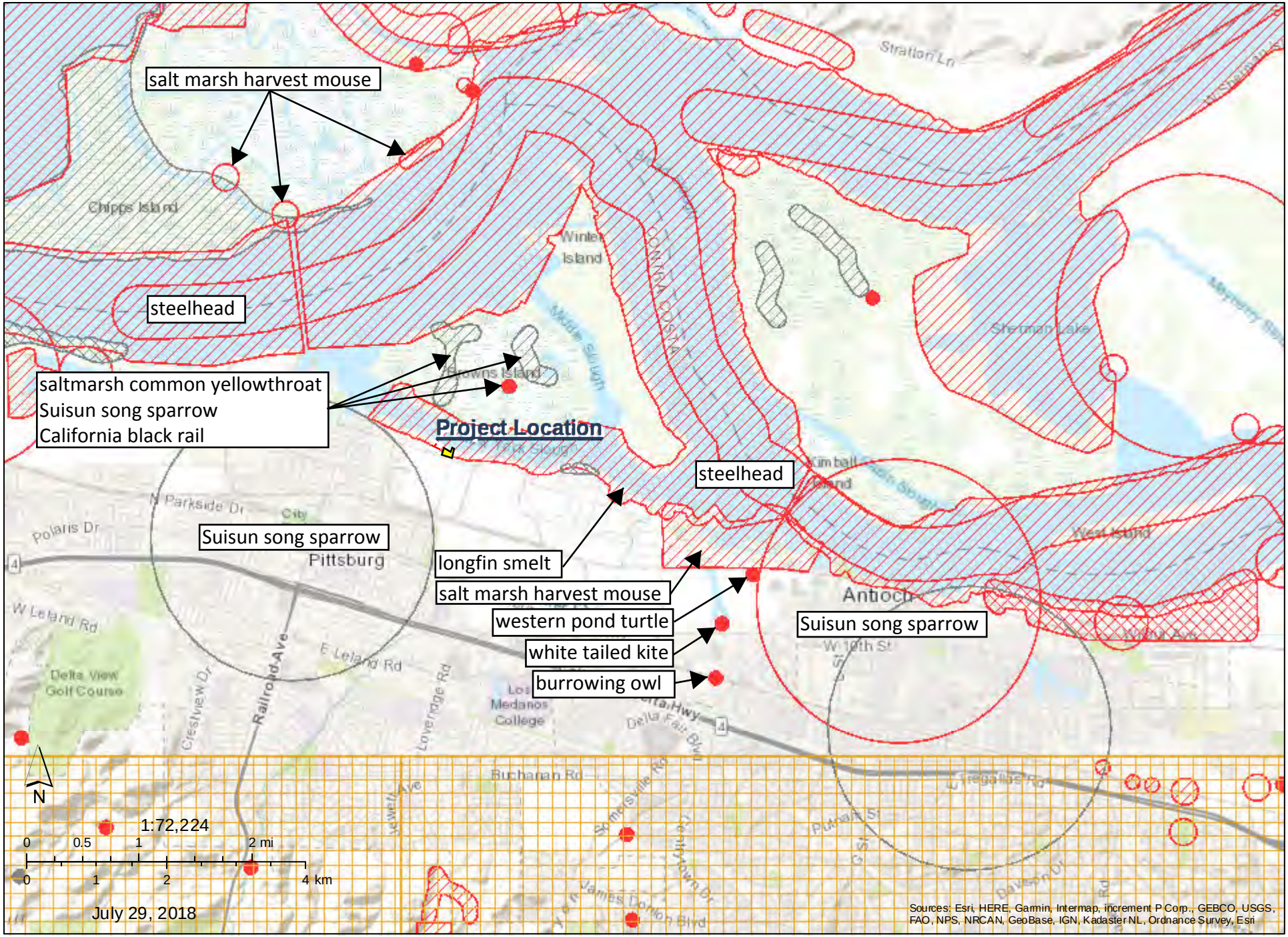
amphibians"[39] and "fully protected fish".[40] The California Code of Regulations (CCR) prohibits the take[41] of fully protected fish[42], certain fur-bearing mammals,[43] and restricts the taking of amphibians[44] and reptiles[45]. Additional definitions are given in CEQA.[46] Impacts on special-status animal species, as thusly defined, may qualify as significant pursuant to the guidelines of the CEQA.

In addition, animal species have been assigned global and State rarity rankings (for a definition of these rankings, see Attachment D). Species with a ranking of G1/S1, G2/S2, or G3/S3 are considered to be critically imperiled, imperiled or vulnerable to extinction within the boundaries of the state, respectively (CDFW, 2018e). As such, these species may be considered to meet the criteria for listing as endangered, threatened or rare under CESA.[47] Species ranked as G4/S4 or G5/S5 are generally considered common enough to be secure and not at risk of extinction. Impacts on special-status animal species, as thusly defined, would be regarded as significant pursuant to CEQA[48] and should be addressed in environmental review documents.[49]

A total of 86 special-status animal species have been recorded in the nine 7.5-minute USGS quadrangles including and surrounding the BSA (CNDDB, 2019; USFWS, 2019). A total of 17 special-status animal species have been recorded from within a 4.8 km (3 mi) radius of the BSA (Figure 6). Based on the existing habitats on site and its geographic location, the occurrence of 72 of these species can be ruled out entirely based on absence of suitable habitat, the site's location outside of the species known range, or absence of regional species occurrences. Although marginally suitable habitat is present within the BSA, the occurrence of another eight of these species are not expected to occur on site due to the site's level of disturbance, habitat alteration, or geographic location relative to known occurrences (see Attachment C).

[38] CFGC § 4700
[39] CFGC § 5050
[40] CFGC § 5515
[41] Pursuant to CFGC § 86, "take" means hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.
[42] 14 CCR § 5.93
[43] 14 CCR § 460
[44] 14 CCR § 5.05
[45] 14 CCR § 5.60
[46] § 15380(d)
[47] CEQA Guidelines § 15380(d)
[48] CEQA Guidelines § 15065(a)
[49] CEQA Guidelines § 15065(b), (c)

Figure 6. Special-Status Animal Records from the Project Vicinity



Although not detected during the present survey, eight of the species could occur within the BSA. Six of these are fish species and include Chinook salmon, Delta smelt, longfin smelt (San Francisco bay delta DPS[50]), green sturgeon, Sacramento splittail, and steelhead (Central Valley DPS and Central California Coast DPS). Also potentially occurring within the BSA are Pacific pond turtle, bank swallow, and a wide variety of migratory bird species. Two marine mammals, harbor seal and California sea lion, are known to move through the project vicinity. These species along with other high-profile species known from the region are described in detail below. Attachment C is a list of all special-status animal species evaluated as part of this analysis. An explanation of all rarity status codes is provided in Attachment D.

Federal/State-Listed, Proposed, Candidate, or Fully Protected Fish and Wildlife Species

Chinook Salmon (Central Valley Spring-Run ESU)

Regulatory Status: Federal: Threatened[51], five-year review completed ((NMFS, 2016); State: Threatened (CDFW, 2018d); CDFW: Special Animal (2018e), Species of Special Concern (Moyle, *et al* 2015); Global/State rarity ranking: G5/S1 (CDFW, 2018e); AFS: Endangered; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW, 2018e). Impacts to species with such rankings are regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Chinook salmon (*Oncorhynchus tshawytscha*) are anadromous, with adults migrating from the ocean into the freshwater streams and rivers of their birth in order to mate. They are semelparous, a reproductive strategy whereby they spawn only once and then die. They are the largest of the salmon species, with adults often exceeding 18 kg (40 lbs). They feed on terrestrial and aquatic insects, amphipods, and other crustaceans while young, and primarily on other fishes when older. Juvenile Chinook may spend from three months to two years in freshwater before migrating to estuarine areas as smolts and then into the ocean to feed and mature. Chinook salmon remain at sea for one to six years (more commonly two to four years), with the exception of a small proportion of yearling males (called jack salmon) which mature in freshwater or return after only two to three months in salt water. They prefer streams that are deeper and larger than those used by other Pacific salmon species.

There are different seasonal "runs" (e.g., spring, summer, fall, or winter) in the migration of Chinook from the ocean to freshwater, even within a single river system. These runs have been identified on the basis of the season in which the adult Chinook enter freshwater to begin their spawning migration. However, distinct runs also differ

[50] Distinct Population Segment
[51] 70 FR 37160

in the degree of maturation at the time of river entry, the temperature and flow characteristics of their spawning site, and their actual time of spawning. Freshwater entry and spawning timing are believed to be related to local temperature and water flow regimes.

The Central Valley spring-run Chinook migrate as immature adults between February and early July, with the peak run occurring in April or May. They will spend the summer in deep pools of their natal rivers and spawn in early fall. Spawning females prepare redds (i.e., nest) in gravelly substrate. After laying eggs, adult Chinook guard their redds from just a few days to nearly a month before dying. Chinook salmon eggs hatch three to five months after deposition. The emerged fry may spend a few months in their natal stream then outmigrate from December through March with the peak downstream migration occurring November to December.

Critical Habitat: Critical habitat has been designated for the Central Valley Spring-Run ESU of Chinook by the NMFS[52]. The project site is located in the North Diablo Range Hydrologic Unit 5543 of designated critical habitat.

Habitat Suitability and Occurrence Data: The 6-inch thermal wastewater outfall is located within suitable habitat for the Central Valley Spring-Run ESU of Chinook. No occurrences for the Central Valley Spring-Run ESU of Chinook have been recorded from within an 8 km (5 mi) radius of the project site (CNDDB, 2019). Nonetheless, due to the presence of suitable aquatic habitat within the BSA and given that the project site is located within designated critical habitat, the presence of Chinook must be assumed.

Potential Project-Related Effects: Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

<u>Chinook Salmon Sacramento River Winter-Run ESU</u>

Regulatory Status: Federal: Endangered[53], five-year review completed ((NMFS, 2011b); State: Endangered (CDFW, 2018f); CDFW: Special Animal; Global/State rarity ranking: G5/S1 (CDFW, 2018e); AFS: Endangered; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW, 2018e). Impacts to

[52] 70 FR 52488
[53] 79 FR 20802

species with such rankings are regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Description: The Sacramento River winter-run Chinook (*Oncorhynchus tshawytscha*) begin their upstream migration in the Sacramento River as immature adults between January and May, with the peak run occurring in March. Reaching the Keswick Dam, which forms Lake Shasta, they spawn from April through early August (Moyle et al., 2008). The young fish appear between July and mid-October, remaining there for five to ten months before moving downstream. Juvenile fish typically enter the Sacramento-San Joaquin Delta from January to April.

The Sacramento River winter-run Chinook ESU includes all naturally spawned populations of winter-run Chinook salmon in the Sacramento River and its tributaries in California, as well as two artificial propagation programs. This ESU is represented by a single extant naturally spawning population that has been completely displaced from its historical spawning habitat by the construction of Shasta and Keswick Dams. The remaining spawning habitat is artificially maintained by cold-water releases from the reservoir behind Shasta Dam.

Critical Habitat: Critical habitat has been designated for the Sacramento River winter-run Chinook ESU (NMFS 1993[54]). Critical habitat includes 1) the Sacramento River from Keswick Dam, Shasta County (river mile 302) to Chipps Island (river mile 0) at the westward margin of the Sacramento-San Joaquin Delta; 2) all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait; 3) all waters of San Pablo Bay westward of Carquinez Bridge, and 4) all waters of San Francisco Bay from of the San Francisco/Oakland Bay Bridge and Golden Gate Bridge to San Pablo Bay. The project site is not located in designated critical habitat for this ESU.

Habitat Suitability and Potential to Occur: The 6-inch thermal wastewater outfall is located within suitable habitat for the Sacramento River winter-run of Chinook. No occurrences for the Sacramento River winter-run of Chinook have been recorded from within an 8 km (5 mi) radius of the project site (CNDDB, 2019). Nonetheless, due to the presence of suitable habitat on site, the presence of Chinook must be assumed.

Potential Project-Related Effects: Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic

[54] 58 FR 33212

habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

Delta Smelt

Regulatory Status: Federal: Threatened (San Francisco Bay/Delta DPS); State: Endangered; CDFW: Special Animal (CDFW 2018e), Species of Special Concern (Moyle, *et al* 2015); Global/State rarity ranking: G1/S1; AFS: Endangered; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW, 2018e). Impacts to species with such rankings are regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Description: The Delta smelt (*Hypomesus transpacificus*) is a small, annual species endemic to the Sacramento-San Joaquin Estuary. Adults range in size from 60-120 mm (2.3-4.7 in) long, have slender, translucent bodies and relatively large eyes (Moyle, 2002). Delta smelt are found only from the Suisun Bay upstream through the Delta in Contra Costa, Sacramento, San Joaquin, Solano, and Yolo Counties. Historically, they occurred from Suisun Bay to Sacramento on the Sacramento River and to Mossdale on the San Joaquin River (Moyle et al., 1992).

Delta smelt spend much of their lives in brackish water, occurring in turbid, trophically rich waters at the freshwater edge of the entrapment zone over large shoals around 7 m (23 ft) deep, feeding on small crustaceans such as copepods and amphipods (Bennett, 2005). They are weakly anadromous, with adults migrating upstream after the first high-winter outflows to spawn in fresh water. Spawning occurs between December and April. Most adults die after spawning.

Critical Habitat: Critical Habitat for the Delta smelt was designated on December 19, 1999[55]. Critical habitat for the species encompasses all waters bounded by and contiguous in Suisun Bay (including the contiguous Grizzly and Honker Bays), the length of Goodyear, Suisun, Cutoff, First Mallard and Montezuma sloughs, and the existing continuous waters contained within the Delta, within Contra Costa, Sacramento, San Joaquin, Solano and Yolo counties.

The proposed project is located on the shores of New York Slough, which is included in the Critical Habitat designation.

Habitat Suitability and Potential to Occur: The 6-inch thermal wastewater outfall is located within suitable migratory habitat for Delta smelt, and the species is presumed to be present. However, the shoreline at the project location does not provide suitable breeding or rearing habitat for the species.

[55] 59 FR 65256

Potential Project-Related Effects: Project implementation would not impede the movement of any fish species. Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

Longfin Smelt

Regulatory Status: Federal: Candidate (San Francisco Bay/Delta DPS); State: Threatened; CDFW: Special Animal (CDFW 2018e), Species of Special Concern (Moyle, *et al* 2015); Global/State rarity ranking: G5/S1; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW, 2018e). Impacts to species with such rankings are regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Description: Longfin smelt (*Spirinchus thaleichthys*) are small fish growing to 9-11 cm (3.5-4.3 in) in length. They inhabit the Sacramento-San Joaquin River Delta, San Francisco Estuary and scattered bays and inlets of the Pacific Coast from Monterey to Alaska. Although consid`ered pelagic and anadromous (Moyle, 2002), certain populations are not anadromous and complete their entire life cycle in freshwater lakes and streams. Within the San Francisco Bay and Delta system, the term pelagic refers to organisms that occur in open water away from the bottom of the water column and away from the shore. Juvenile and adult longfin smelt have been found throughout the year in salinities ranging from pure freshwater to pure seawater.

In the San Francisco Bay and Delta system, longfin smelt typically spend their first year of life in Suisun Bay and Suisun Marsh. The remainder of their life is spent in the Bay or Gulf of Farallones (Moyle, 2008). In their second winter, longfin smelt return to the Bay and migrate upstream to spawn. Spawning occurs in fresh water over sandy-gravelly substrates, rocks and aquatic plants and may occur as early as November and as late as June, although spawning typically occurs from January to April (Moyle, 2002). In the Delta, the furthest downstream longfin have been known to spawn is in the upper Suisun Bay around Pittsburg and Montezuma Slough in Suisun Marsh (Robinson and Greenfield, 2011). Larvae move downstream into the Estuary January through March, where juveniles and adults feed on small copepods and mysid shrimp. Juveniles and adults aggregate in deep-water channels and over shoals greater than 7 m (23 ft) deep. The species is thought to be intolerant temperatures greater than >22°C (72°F). Longfin smelt usually live for two years, spawn and then die (Moyle, 2002).

Critical Habitat: Critical Habitat has not been designated for the longfin smelt.

Habitat Suitability and Potential to Occur: The 6-inch thermal wastewater outfall is located within suitable habitat for longfin smelt. The San Joaquin River and New York Slough may support longfin smelt of unknown numbers and life stages. In the CNDDB, this record (Occ. #45) is based on sampling conducted between 1979 and 1982.

Potential Project-Related Effects: No suitable spawning habitat for longfin smelt is present within the BSA. However, migrating and foraging longfin smelt may occur in the project vicinity. Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

North American Green Sturgeon

Regulatory Status: Federal: Threatened (Southern DPS); State: Threatened; CDFW: Special Animal (CDFW 2018e), Species of Special Concern (Moyle, *et al* 2015); Global/State rarity ranking: G3/S1S2; AFS: Vulnerable; species assigned a ranking of S1 are considered critically imperiled in the state because of their extreme rarity or due to factors making them especially vulnerable to extirpation (CDFW, 2018e). Impacts to species with such rankings are regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

The North American green sturgeon (*Acipenser medirostris*) is a long-lived, slow-growing anadromous fish species found primarily in marine and estuarine waters of the eastern Pacific. The species ranges from Mexico to at least Alaska in marine waters and is observed in bays and estuaries up and down the west coast of North America (Moyle et al., 1995). They are believed to spend the majority of their lives in nearshore oceanic waters, bays, and estuaries, spawning in the Rogue, Klamath and Sacramento rivers. Young green sturgeon reside in fresh water, with adults returning to freshwater to spawn when they are about 15 years of age and more than 1.3 m (4 ft) in length. Spawning is believed to occur every two to five years (Moyle, 2002).

The Southern DPS consists of the population segment of green sturgeon that utilizes the Sacramento River and tributaries for spawning; the Sacramento River contains the only known spawning population in the DPS. In winter, they aggregate in estuaries and migrate north along the North Pacific coastal shelf. They overwinter in waters

north of Vancouver Island and return south in spring. Mature fish enter and migrate rapidly up the Sacramento River in March and April, where they spawn and then either return to the estuary or over-summer and migrate out of the river with the first fall flow event (Heublein et al., 2009). They may be found in San Francisco Bay throughout the year, though numbers increase in summer with the return of migrants moving into the estuary for feeding, holding, and spawning (Lindley et al., 2011). In the San Francisco Estuary, green sturgeon are associated with turbid water where they prey on benthic organisms such as clams and crabs. Green sturgeon live from 40 to 60 years.

Critical Habitat: Critical habitat has been designated for the Southern DPS of North American green sturgeon by NMFS[56]. The project site is located within designated critical habitat.

Habitat Suitability and Occurrence Data: The 6-inch thermal wastewater outfall is located within suitable habitat for North American green sturgeon belonging to the Southern DPS. No nearby occurrences of this DPS are recorded by the CNDDB (2019). Nonetheless, due to the presence of suitable aquatic habitat on site and given that the project site is located within designated critical habitat, the presence of sturgeon must be assumed.

Potential Project-Related Effects: Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

Sacramento Splittail

Regulatory Status: Federal: Candidate[57]; State: None; CDFW: Special Animal (CDFW 2018e), Species of Special Concern (Moyle, *et al* 2015); Global/State rarity ranking: G2/S2; AFS: Vulnerable; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018e). As such, the species may be considered to meet the criteria for listing as endangered, rare or threatened pursuant to the statutes and guidelines of CEQA.[58] Impacts to species with such a ranking may be regarded as significant pursuant to the statutes and guidelines of CEQA and should be addressed in environmental review documents.

[56] 74 FR 52300

[57] 77 FR 19756

[58] CEQA § 15380(d)

Description: Sacramento splittail (*Pogonichthys macrolepidotus*) is the only member of the genus and endemic to central California. The fish have elongate body that is dusky olive-gray on back with silvery sides, with a small head and enlarged upper tail lobe. Adults reach a length of 40 cm (16 in). Splittail live as long as 8-10 years, reaching maturity at around two years of age.

Splittail are currently restricted to brackish waters of the San Francisco estuary and its tributaries and are found most often in slow moving sections of rivers and sloughs including dead end sloughs and shallow edge habitats (Moyle, 2002). It is known from the Sacramento, San Joaquin, Napa, Mokelumne and Petaluma rivers (Sommer et al., 2007). Its distribution is limited to the estuary and estuarine environments of large streams, including lower Walnut Creek, where it inhabits small, shallow, turbid sloughs lined with emergent vegetation (Leidy, 2007). Splittail are frequently found in areas subject to flooding because they require flooded vegetation for spawning and rearing in waters at least 1 m (3.3 ft) deep. Spawning occurs from late February to July, with peak spawning in March and April. Young-of-year splittail move into the estuary between April and August where they inhabit broad shoals or channels of intertidal habitat at the mouths of estuarine streams (Feyrer et al., 2005). Splittail feed on benthic macroinvertebrates and detritus.

Critical Habitat: Critical Habitat has not been designated for the Sacramento splittail.

Occurrence Data and Habitat Suitability: The project site is located within suitable habitat for the Sacramento splittail. The species is considered to potentially occur on site. Sacramento splittail has not been recorded from within an 8 km (5 mi) radius of the project site (CNDDB, 2019). The 6-inch thermal wastewater outfall is located within suitable habitat, therefore, the presence of longfin smelt must be assumed.

Potential Project-Related Effects: No suitable spawning habitat for longfin smelt is present within the BSA. However, migrating and foraging longfin smelt may occur in the project vicinity Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

Steelhead

Regulatory Status: Federal: Threatened[59], five-year review completed (NMFS, 2016); State: None; CDFW: Special Animal (CDFW 2018e), Species of Special Concern (Moyle, *et al* 2015); Global/State rarity ranking: G5T2/S2; AFS: Threatened; species assigned a ranking of S2 are considered imperiled in the state due to their very restricted range, very few populations, or other factors making them very vulnerable to extirpation (CDFW, 2018e). Impacts to species with such rankings are regarded as significant pursuant to CEQA and should be addressed in environmental review documents.

Description: Central Valley steelhead (*Oncorhyncus mykiss*) mature between two and three years of age. They are mainly "winter" run, though a small summer-run population exists. The small summer-run population migrates into the Sacramento River starting in July. The majority of steelhead begin migration in the fall. Spawning migration peaks in September and October and may continue through February or March. Unlike the Chinook salmon, not all steelhead die after spawning. Some may return to the ocean and return to spawn several times. Most juvenile steelhead spend one to two years in fresh water before migrating toward the ocean in the winter and spring, with an outmigration peak in mid-March (Moyle et al., 2008). USFWS trawl data from Chipps Island, indicate that juvenile steelhead are present in Suisun Bay from at least October through July, with hatchery fish (clipped adipose fin) emigration peaking between January and March, and wild juvenile outmigration more evenly spread out over six months or more (USFWS, 2008). The difference in emigration peak is a reflection of the timing of hatchery releases of juvenile steelhead. Fish salvage data from the Delta pumps indicate that most steelhead move through the Delta from November to June, with the peak numbers occurring in February through April (USFWS, 2008).

The Central Valley steelhead DPS includes all naturally spawned populations of steelhead below natural and manmade impassable barriers in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco and San Pablo Bays and their tributaries. The Sacramento and San Joaquin rivers offer the only migration route to the drainages of the Sierra Nevada and southern Cascade mountain ranges for anadromous fish. The distance from the Pacific Ocean to spawning streams can exceed 300 km (186 mi), providing unique potential for reproductive isolation among steelhead. Critical Habitat for the Central Valley DPS encompasses 67 watersheds within its freshwater and estuarine range. Critical Habitat includes the entire watersheds of the Northern Diablo Range, Sutter Creek, Omo Ranch, Consumnes, Big Canyon Creek, Herald, Ono, Nevada City, Mildred Lake, Elmira and Paynes, along with a portion of the Lower Mokelumne watershed and the deep water shipping channel of the Sacramento Delta.

[59] 71 FR 834

Critical Habitat: Critical Habitat has been designated for the Central Valley DPS of steelhead by the NMFS (2005b). The project site is not located within designated Critical Habitat for the species.

Habitat Suitability and Potential to Occur: The project site is located within suitable habitat for the Central Valley DPS of steelhead. One occurrence for the Central Valley DPS of steelhead is recorded from within an 8 km (5 mi) radius of the project site (CNDDB 2019). This record (Occ. #27) is a 2012 sighting from the Bouldin Island quadrangle.

Potential Project-Related Effects: The 6-inch thermal wastewater outfall is located in suitable habitat for the Central Valley DPS of steelhead. Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

Other Sensitive and Locally Rare Wildlife Species

Pacific Pond Turtle

Regulatory Status: FESA: none; CESA: none; CDFW: Species of Special Concern; BLM: Sensitive (southwestern pond turtle); USFS: Sensitive; Global/State rarity ranking: G3G4/S3.

Description: The Pacific pond turtle (*Emys marmorata*, hereafter referred to as PPT[60]), is the only fresh-water turtle native to greater California. It is distributed along much of the West Coast from the Puget Sound in Washington south to the Baja Peninsula, Mexico. Overall, the PPT is a habitat generalist and has been observed in slow-moving rivers and streams (e.g. in oxbows), lakes, reservoirs, permanent and ephemeral wetlands, stock ponds, and sewage treatment plants. The species prefers aquatic habitat with refugia such as undercut banks and submerged vegetation (Holland, 1994), and requires emergent basking sites such as mud banks, rocks, logs, and root wads to thermoregulate their body temperature (Holland, 1994; Bash, 1999). The PPT is omnivorous, feeding on a variety of aquatic and terrestrial invertebrates, fish, amphibians and aquatic plants.

The PPT regularly utilizes upland terrestrial habitats, most often during the summer and winter, especially for oviposition (i.e., egg-laying), overwintering, seasonal

[60] Formerly classified as *Clemmy marmorata* and *Actinemys marmorata*; also known as western pond turtle.

terrestrial habitat use, and overland dispersal (Reese, 1996; Holland, 1994). Females have been reported to range as far as 500 m (1640 ft) from a watercourse to find suitable nesting habitat (Reese and Welsh, 1997). Nest sites are most often situated on south or west-facing slopes, are sparsely vegetated with short grasses or forbs, and are scraped in sands or hard-packed, dry, silt or clay soils (Holland, 1994; Rathbun et al., 1992; Holte, 1998; Reese and Welsh, 1997). The species exhibits high site fidelity, returning in sequential years to the same terrestrial site to nest or overwinter (Reese, 1996).

Females lay their clutches as early from as early as the end of April in the southern half of the State, although they egg laying occurs predominantly in June and July. In the early morning or late afternoon, gravid females leave the water and move upland to nest (Holland, 1994). Natural incubation times vary, ranging from 80 to 100 days in California. In northern California and Oregon, hatchlings remaining the nest after hatching and overwinter, emerging in the spring. In southern and central California, those PPTs that don't overwinter emerge from the nest in the early fall (Holland, 1994).

Critical Habitat: Critical Habitat has not been designated for the PPT. The proposed project would not result in impacts to Critical Habitat for this species.

Habitat Suitability and Potential to Occur: The waters of New York Slough and its banks provide both suitable breeding habitat and a movement corridor for PPT. While the section in which the project is located provides perennial water, it lacks vegetative cover and warm, sandy banks for breeding. However, the project site is not mapped as providing either core or movement habitat for PPT (Jones & Stokes, 2006). No PPTs were observed during the present survey.

There are four records of the species occurring within 4.8 km (3 mi) of the project site. This nearest record (Occ. #144) consists of two adults observed in 1998 in a pond on the Dow Chemical facility on the south shoreline of New York Slough approximately 1.5 km (0.9 mi) east of the project site.

Potential Project-Related Effects: Construction and operation of the proposed project would not result in take of the species, or significant adverse effects pursuant to CEQA. The existing stormwater outfall would continue to function as it currently does. Discharge of thermal wastewater through the existing 6-inch outfall will be consistent with previously permitted use, and will not result in changes to aquatic habitat. Impact avoidance measures are recommended to be included as part of the proposed project, as outlined in Section 5.3, below.

<u>Migratory Birds</u>

The BSA supports suitable nesting habitat for a variety of special-status and migratory passerines (perching birds), mainly consisting of the row of eucalyptus trees on the eastern portion of the site. A few other small trees and ornamental shrubs provide some nesting opportunities, as well. Migratory birds are protected under the MBTA and MBTRA. Under the MBTA it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. A list of bird species covered under the MBTA is maintained by the USFWS (2013). Certain other migratory birds receive protection under the BGEPA and CFGC. Impacts to birds species covered under the MBTA are regarded as significant pursuant to the statutes and guidelines of CEQA and should be addressed in environmental review documents.

No bird nests were observed on site during the present survey.

If nesting pairs are present at the time of construction, direct or indirect impacts on breeding migratory birds could result. Such impacts would be considered significant pursuant to the statutes and guidelines of CEQA. Impact avoidance measures are warranted and are outlined in Section 5.3, below.

5.0 CONCLUSIONS AND RECOMMENDATIONS

As described in Section 3.0, the BSA consists mainly of a paved property that was formerly an industrial facility. A small portion of the project (i.e. approximately 25 lf of shoreline), including a stormwater outfall and a 6-inch wastewater discharge outfall, are located along the southern shore of New York Slough just upstream (east) of the confluence with the Sacramento River, opposite of Browns Island, and 1.0 km (0.6 mi) east of the Pittsburg Marina (Figure 1). The property is bordered by existing and former industrial facilities and open fallow fields. Most of the remaining shoreline within the limits of the City of Pittsburg supports primarily industrial and some residential and recreational development. Plant communities and habitats occurring within the BSA include anthropogenic, aquatic, littoral zone, river bank, and ruderal uplands. Although developed and highly altered by agriculture which predated the current industrial use, the shoreline and aquatic habitat within the BSA is considered to have relatively high wildlife habitat values.

However, implementation of the proposed project would not result in direct or indirect impacts to jurisdictional wetlands and other waters of the U.S. and of the State, essential fish habitat, or special-status plant or wildlife species. One special status plant, Mason's lilaeopsis, occurs within the BSA, but would also not be directly or indirectly impacted by the proposed project. For those biological resources that are located within the BSA, or may be assumed to pass nearby during movement within New York, Slough, the following avoidance measures are recommended to be included as part of the proposed project.

5.1 Special-status Natural Communities and Landscape Features

As discussed in Section 4.1, the proposed action would not impact Waters of the U.S. and Waters of the State, and falls under the jurisdiction of federal and state regulatory agencies. The project site touches upon waters designated as Essential Fish Habitat. It also overlaps with designated critical habitat for two federally listed animal species; this is discussed under the headings for each species in Sections 5.2 and 5.3, below.

Implications for the Proposed Project: Jurisdictional Wetlands and Waters of the U.S./Waters of the State

As described in Section 4.1 above, project implementation would not result in potentially significant impacts to features falling under the jurisdiction of the USACE, CDFW and RWQCB. No discharge of fill material into waters of the U.S. or of the state would occur, nor would there be any alteration of the bed or bank of New York Slough, and no loss or impact to jurisdictional wetlands or riparian habitat, or loss of beneficial uses associated with them. Therefore, no action would occur that would be subject to federal, state and

local laws and policies that regulate wetlands and other waters[61], nor would there be impacts to these resources considered significant pursuant to the statutes and guidelines of CEQA. To avoid, minimize or mitigate for impacts associated with the project, the measures outlined below should be incorporated into the project design.

Implications for the Proposed Project: Eelgrass Habitat

The presence of eelgrass beds is not expected within the work area and would not be directly or indirectly impacted by project implementation. No impact avoidance, minimization or mitigation measures are warranted.

Implications for the Proposed Project: Essential Fish Habitat

The project site is located within designated EFH for the Pacific Groundfish Fishery. Operation of the thermal wastewater discharge would be within permitted parameters for temperature, and would not result in adverse effects on EFH.

Implications for the Proposed Project: Critical Habitat

The project site is located within designated critical habitat for Delta smelt and spring-run Chinook; project construction and operation would not result in take of these species. Impact avoidance and minimization measures are warranted.

5.2 Special-Status Plant Species

One state-listed plant species, Mason's lilaeopsis, is present on the shoreline of the BSA. No impact this species would result from construction or operation of the proposed project. However, because of its location within the project area, the incorporation of the measures outlined below are recommended to ensure potential impacts would be avoided..

Implications for the Proposed Project: Special-Status Plant Species

One special-status species, Mason's Lilaeopsis, was detected within the BSA. Although not detected, suitable or marginally suitable habitat is present on the shoreline for several other special status species, such as Suisun marsh aster. Accidental impacts could result during movement or placement of equipment or people near stormwater outfall. With the incorporation of the measures outlined below, potential impacts would be reduced to a less-than-significant level pursuant to CEQA.

1. The location of special-status plants and suitable habitat shall be designated as environmentally sensitive areas and clearly marked in the field with high visibility construction fencing or staking prior to construction and operations.

[61] Except with regard to NPDES; see Section X. X Hydrology.

2. The identification and protection of special-status plant populations and habitats shall be a part of a worker environmental awareness program (WEAP) for all workers onsite. A video tape of the initial training session can be used for orientation of new employees onsite. Documentation of participation shall be kept onsite for review by City and/or resource agencies.
3. Alteration of the riprap at the stormwater outfall shall be avoided. Boats, barges and any floating or submerged equipment should be prevented from contacting the shoreline to avoid crushing native vegetation.
4. An Project Biologist with 3 years of professional biological experience in the San Francisco Bay Delta region (resume onsite for City and/or resource agency review) shall inspect the shoreline for proper maintenance of the construction fencing or staking, and identify activities that may pose a risk of impacting special-status plant populations and habitats annually.
5. The project biologist shall report any rare plant observations to the CNDDB. Accidental impacts to rare plant populations shall be reported to the CDFW. Discovery of any additional special status plants species will be reported to the CDFW, and a suitable response agreed upon before restating work in that area.
6. If changes to the condition of the shoreline are determined to be necessary, then the project proponent will prepare a Mitigation and Monitoring Plan (MMP) subject to approval by regulatory agencies including launching boats from shoreline or working on the storm drain or cooling water discharge pipe.

5.3 Special-Status Animal Species

As described in Section 4.3 above, suitable or marginally suitable habitat is present on site for a total of eight special-status animal species. These include six fish species (Chinook salmon, Delta smelt, longfin smelt, green sturgeon, Sacramento splittail, and steelhead). Also potentially occurring within the BSA are Pacific pond turtle, bank swallow. No activities associated with construction or operation of the proposed project are expected to have any adverse effect on these species.

However, because of the sensitivity of the aquatic species and their habitat, a discussion of the implications and impact avoidance measures are is presented below.

Implications for the Proposed Project: Special-Status Fish Species

Project implementation could result in significant adverse effects on Delta smelt and chinook salmon (Central Valley spring-run Evolutionarily Significant Unit [ESU[62]] and Sacramento River winter-run ESU), longfin smelt, Sacramento perch, Sacramento splittail,

[62] NMFS has relied on the Evolutionarily Significant Unit (ESU) concept and considers DPSs to represent ESUs if the population is reproductively isolated and represents an important component in the evolutionary legacy of the species.

as well as designated EFH for the Pacific Groundfish Fishery. Protected marine mammals that may also occur in the project vicinity include California sea lion and harbor seal. With the incorporation of the measures outlined below, potential impacts would be reduced to a less-than-significant level pursuant to CEQA.

1. The identification and protection of special-status species populations and habitats shall be a part of a worker environmental awareness program (WEAP) for all workers onsite. A video tape of the initial training session can be used for orientation of new employees onsite. Documentation of participation in training shall be kept onsite for review by City and/or resource agencies.

2. No work will occur within the waters of New York Slough.
3. All discharges through the stormwater outfall will be the same as with current and past use of the site, i.e. conveyance and discharge of runoff from the project site only, through existing catchments and culverts.
4. No alteration or reconfiguration of the shoreline at the stormwater outfall would occur. The existing rock slope protection and soil on the shoreline shall be left in place.
5. No change to the location or operation of the 6-inch thermal wastewater outfall shall occur. The discharge will be operated according to previously permitted operation parameters with regard to volume and of the discharge and allowable temperature changes within the aquatic environment, to be outlined in an NPDES permit specific to the proposed project.
6. To ensure toxic substances are not released into the aquatic environment, the following measures shall be followed:
    a. all engine-powered equipment shall be well-maintained and free of leaks of fuel, oil, hydraulic fluid or any other potential contaminant;
    b. all engine-powered equipment used and operated from the decks of barges, boats or the wharf shall be positioned over drip-pans;
    c. a spill prevention and response plan shall be prepared in advance of the commencement of work; a spill kit with appropriate clean-up supplies shall be kept on hand during the construction and operations phases of the project;
    d. refueling and maintenance or mobile equipment shall not be performed directly over the waters of the river. Only approved and certified fuel cans with "no-spill" spring-loaded nozzles shall be used.
7. Any wildlife encountered during work shall be allowed to leave the construction area unharmed and shall not be flushed, hazed, or herded away from the project site.
8. Any special-status species detected shall be reported to the CDFW and a survey form shall be submitted to the CNDDB.

Implications for the Proposed Project: Pacific Pond Turtle

Although no individuals of Pacific pond turtle were observed during the present survey, the species is known to inhabit stream mouths and the shoreline of the San Joaquin River in Contra Costa County. The river bank at the project could attract pond turtles due; marginally suitable spots for sunning are present on site. Warm, sandy banks are not present on site for egg-laying. Nonetheless, Pacific pond turtles could move through the work area along the shoreline between occupied habitats. If present, individuals could be harmed during construction activities. With the incorporation of the measures outlined below, potential impacts would be reduced to a less-than-significant level pursuant to CEQA.

1. Boats, barges and any floating or submerged equipment should be prevented from contacting the shoreline to avoid crushing individuals that may move through the work area.
2. If pond turtles are observed, they should be permitted to move out of the work area on their own. If pond turtles are stationary and remain in harm's way, they may be relocated; only a qualified biologist with a valid scientific collecting permit and prior authorization from the CDFW may relocate Pacific pond turtles.
3. The project biologist shall report any sightings, relocations or mortalities of Pacific pond turtle to the CDFW.

Implications for Proposed the Project: Special-Status and Migratory Birds

Although the removal or pruning of trees or other vegetation on the river banks is not proposed, project implementation would temporarily increase noise and human activity levels nearby; these activities could result in indirect impacts on birds by disrupting breeding or causing abandonment of occupied nests. If present at the time of construction, such indirect impacts on special-status and migratory birds would be considered significant pursuant to CEQA. To ensure compliance to the MBTA and the CFGC related to protections for migratory birds, the measures outlined below should be performed prior to the commencement of construction activities. With the incorporation of the measures outlined below, potential impacts would be reduced to a less-than-significant level pursuant to CEQA.

1. If construction activities are scheduled to occur outside of the breeding season (i.e., September 1 through January 31), no preconstruction surveys or other mitigation measures are necessary.
2. If construction activities are scheduled to occur during the breeding season (i.e., February 1 through August 31), a preconstruction nesting bird survey should be conducted of the wharf structures, the identified work area and a buffer zone (see #3, below). The survey should be performed by a qualified biologist no more than two weeks prior to the initiation of work. If no nesting or breeding activity is

observed, work may proceed without restrictions. To the extent allowed by access, all active nests identified within 76 m (250 ft) for raptors and 33 m (100 ft) for passerines should be mapped.

3. For any active nests found near the construction limits (76 m [250 ft] for raptors and 33 m [100 ft] for passerines), the project biologist should make a determination as to whether or not construction activities are likely to disrupt reproductive behavior. If it is determined that construction is unlikely to disrupt breeding behavior, construction may proceed. If it is determined that construction may disrupt breeding, the no-construction buffer zone should be expanded; avoidance is the only mitigation available. The ultimate size of the no-construction buffer zone may be adjusted by the project biologist based on the species involved, topography, lines of site between the work area and the nest, physical barriers, and the ambient level of human activity. For raptors, the project biologist will contact CDFW and/or the USFWS Division of Migratory Bird Management for guidance regarding site evaluations and buffer adjustments.

   If it is determined that construction activities are likely to disrupt raptor breeding, construction activities within the no-construction buffer zone may not proceed until the project biologist determines that the nest is long longer occupied.

4. If maintenance of a no-construction buffer zone is not practicable, active nests should be monitored by a qualified biologist to document breeding and rearing behavior of the adult birds. If it is determined that construction activities might cause nest abandonment, work should cease until the project biologist determines that the nest is long longer occupied. For raptors, the CDFW and/or the USFWS Division of Migratory Bird Management should be contacted for guidance.

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ATTACHMENT A

SITE PHOTOGRAPHS

Photographs taken April 26, 2019

Photo 1
Typical paved conditions on site, looking northwest.

Photo 2
Ruderal habitat in unpaved area.

Photo 3
Row of eucalyptus trees along western property line.

Photo 4
Typical shoreline condition at stormwater outfall. Sparse wetland vegetation in riprap, with Mason's lilaeopsis located within red circle.

Photo 5
Close-up of Mason's lilaeopsis at stormwater outfall.

ATTACHMENT B

SPECIAL-STATUS PLANT SPECIES EVALUATED FOR THE CARBON CAPTURE AND MINERALIZATION PROJECT, 895 E. THIRD STREET, PITTSBURG, CA

Potentially Occurring Special Status Plant Species

May 16, 2019

Wood Biological Consulting

FAMILY

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Adoxaceae - Muskroot Family				
Viburnum ellipticum oval-leaved viburnum	Federal: none State: none CNPS: 2B.3 CNDDB: G4G5/S3? Other: DFG: SP	Occurs in chaparral, cismontane woodland, lower montane coniferous forest. Recorded from Contra Costa, El Dorado, Fresno, Glenn, Humboldt, Mendocino, Napa, Shasta, Sonoma, Tehama.Also recorded from Oregon, Washington.	May-Jun Shrub (deciduous)	None: no suitable habitat present.
Alismataceae - Water-plantain Family				
Sagittaria sanfordii Sanford's arrowhead	Federal: none State: none CNPS: 1B.2 CNDDB: G3/S3 Other: DFG: SP	Occurs in freshwater marsh, marshes and swamps Moisture: shallow-water. Recorded from Butte, Del Norte, Fresno, Kern, Merced, Orange, Sacramento, San Joaquin, Shasta, Tehama, Ventura.	May-Oct Perennial Herb (rhizomatous), Emergent	None: no suitable habitat present.
Apiaceae - Carrot Family				
Cicuta maculata var. *bolanderi* Bolander's water hemlock	Federal: none State: none CNPS: 2B.1 CNDDB: G5T4/S2 Other:	Occurs in marshes and swamps. Moisture: freshwater or brackish. Recorded from Contra Costa, Los Angeles, Marin, Sacramento, San Luis Obispo, Santa Barbara, Solano. Recorded from within 1 mile of project site..	Jul-Sep Perennial Herb	Absent marginally suitable habitat present. Would have been detectable during present survey.
Eryngium jepsonii Jepson's coyote thistle	Federal: none State: none CNPS: 1B.2 CNDDB: G2?/S2? Other: DFG: SP	Occurs in valley and foothill grassland, vernal pools Moisture: vernally-flooded. Recorded from Alameda, Contra Costa, Napa, San Mateo, Solano, Yolo.	Apr-Aug Perennial Herb	None: no suitable habitat present.

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Lilaeopsis masonii Mason's lilaeopsis	Federal: none State: SR CNPS: 1B.1 CNDDB: G2/S2 Other: DFG: SP	Occurs in brackish and freshwater marshes and swamps, riparian scrub. Recorded from Alameda, Contra Costa, Marin, Napa, Sacramento, San Joaquin, Solano, Yolo. Recorded from within 1 mile of project site..	Apr-Nov Perennial Herb (rhizomatous)	Present: suitable habitat present. Would have been detectable during present survey.
Sanicula saxatilis rock sanicle	Federal: none State: SR CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in broadleafed upland forest, chaparral, valley and foothill grassland Substrate: rocky. Recorded from Contra Costa, Santa Clara.	Apr-May Perennial Herb	None: no suitable habitat present.
Asteraceae - Sunflower Family				
Blepharizonia plumosa big tarplant	Federal: none State: none CNPS: 1B.1 CNDDB: G2/S2 Other: DFG: SP	Occurs in valley and foothill grassland. Recorded from Alameda, Contra Costa, San Joaquin, Stanislaus. Additional distribution: presumed extirpated in Solano County. Recorded from within 1 mile of project site..	Jul-Oct Annual Herb	None: no suitable habitat present.
Centromadia parryi ssp. *congdonii* Congdon's tarplant	Federal: none State: none CNPS: 1B.1 CNDDB: G3T2/S2 Other: DFG: SP	Occurs in valley and foothill grassland. Substrate: alkaline. Recorded from Alameda, Contra Costa, Monterey, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Solano. Additional distribution: presumed extirpated in Santa Cruz and Solano counties.	May-Nov Annual Herb	Absent marginally suitable habitat present. Would have been detectable during present survey.
Centromadia parryi ssp. *parryi* pappose tarplant	Federal: none State: none CNPS: 1B.2 CNDDB: G3T2/S2 Other:	Occurs in coastal prairie, meadows, seeps, coastal salt marsh, valley and foothill grassland. Moisture: vernally mesic,Substrate: often alkaline, Recorded from Butte, Colusa, Glenn, Lake, Napa, San Mateo, Solano, Sonoma.	May-Nov Annual Herb	Absent no suitable habitat present. Would have been detectable during present survey.

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Cirsium hydrophilum var. *hydrophilum* Suisun thistle	Federal: FE State: none CNPS: 1B.1 CNDDB: G2T1/S1 Other: DFG: SP	Occurs in coastal salt marsh, marshes and swamps. Recorded from Solano.	Jul-Sep Perennial Herb	None: no suitable habitat present.
Eriophyllum jepsonii Jepson's woolly sunflower	Federal: none State: none CNPS: 4.3 CNDDB: G3/S3 Other: DFG: SP	Occurs in chaparral, cismontane woodland, coastal sage scrub, coastal scrub, foothill woodland, northern coastal scrub Substrate: serpentine. Recorded from Alameda, Contra Costa, Kern, San Benito, Santa Clara, Stanislaus, Ventura.	Apr-Jun Perennial Herb	None: no suitable habitat present.
Helianthella castanea Diablo helianthella	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in broadleafed upland forest, chaparral, cismontane woodland, coastal scrub, riparian woodland, valley and foothill grassland. Recorded from Alameda, Contra Costa, Marin, San Mateo, San Francisco. Additional distribution: presumed extirpated in Marin and San Francisco counties.	Mar-Jun Perennial Herb	None: no suitable habitat present.
Hesperevax caulescens hogwallow starfish	Federal: none State: none CNPS: 4.2 CNDDB: G3/S3 Other: DFG: SP	Occurs in foothill woodland, valley and foothill grassland. Moisture: mesic,Substrate: clay, Recorded from Alameda, Amador, Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Merced, Napa, San Diego, San Joaquin, San Luis Obispo, Solano, Stanislaus, Sutter, Tehama, Yolo.	Mar-Jun Annual Herb	None: no suitable habitat present.
Isocoma arguta Carquinez goldenbush	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in valley and foothill grassland Substrate: alkaline, Habitats Note: alkaline. Recorded from Contra Costa, Solano.	Aug-Dec Shrub	None: no suitable habitat present.

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Lasthenia conjugens Contra Costa goldfields	Federal: FE State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in cismontane woodland, playas (alkaline), valley and foothill grassland, vernal pools Moisture: mesic. Recorded from Alameda, Contra Costa, Marin, Mendocino, Monterey, Napa, Santa Barbara, Santa Clara, Solano, Sonoma. Additional distribution: presumed extirpated in Mendocino, Santa Barbara and Santa Clara counties.	Mar-Jun Annual Herb	None: no suitable habitat present.
Madia radiata showy madia	Federal: none State: none CNPS: 1B.1 CNDDB: G2/S2 Other: DFG: SP	Occurs in cismontane woodland, valley and foothill grassland. Recorded from Contra Costa, Fresno, Kern, Kings, Monterey, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Stanislaus. Additional distribution: Presumed extirpated from Contra Costa, Kings, Monterey, Santa Barbara and San Joaquin counties..	Mar-May Annual Herb	None: no suitable habitat present.
Microseris paludosa marsh microseris	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in closed-cone coniferous forest, cismontane woodland, coastal scrub, valley and foothill grassland. Recorded from Marin, Mendocino, Monterey, San Benito, San Francisco, San Luis Obispo, San Mateo, Santa Cruz, Sonoma; presumed extirpated in San Francisco and San Mateo counties.	Apr-Jul Perennial Herb	None: no suitable habitat present.
Monolopia gracilens woodland woollythreads	Federal: none State: none CNPS: 1B.2 CNDDB: G3/S3 Other:	Occurs in broadleafed upland forest (openings), chaparral (openings), cismontane woodland, North Coast coniferous forest (openings), valley and foothill grassland. Substrate: serpentinite. Recorded from Alameda, Contra Costa, Monterey, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz.	Feb-Jul Annual Herb	None: no suitable habitat present.
Senecio hydrophiloides sweet marsh ragwort	Federal: none State: none CNPS: 4.2 CNDDB: Other: DFG: SP	Occurs in lower montane coniferous forest, meadows, yellow pine forest Moisture: moist. Recorded from Lassen, Modoc, Plumas, Siskiyou.Also recorded from Nevada, Oregon.	May-Aug Perennial Herb	None: no suitable habitat present.

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Symphyotrichum lentum Suisun Marsh aster	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in brackish and freshwater marshes and swamps. Recorded from Contra Costa, Napa, Sacramento, San Joaquin, Solano. Recorded from within 25ft of project site..	Apr-Nov Perennial Herb (rhizomatous)	Present: suitable habitat present. Would have been detectable during present survey.
Boraginaceae - Borage Family				
Amsinckia grandiflora large-flowered fiddleneck	Federal: FE State: SE CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in cismontane woodland, valley and foothill grassland. Recorded from Alameda, Contra Costa, San Joaquin.	Apr-May Annual Herb	None: no suitable habitat present.
Cryptantha hooveri Hoover's cryptantha	Federal: none State: none CNPS: 1A CNDDB: GH/SH Other: DFG: SP	Occurs in inland dunes, valley and foothill grassland (sandy). Substrate: sandy. Recorded from Contra Costa, Madera, Stanislaus. Presumed extinct.	Apr-May Annual Herb	None: no suitable habitat present.
Phacelia phacelioides Mt. Diablo phacelia	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in chaparral, cismontane woodland Substrate: rocky. Recorded from Contra Costa, San Benito, Santa Clara, Stanislaus.	Apr-May Annual Herb	None: no suitable habitat present.
Plagiobothrys hystriculus bearded popcorn-flower	Federal: none State: none CNPS: 1B.1 CNDDB: G2/S2 Other: DFG: SP	Occurs in valley and foothill grassland, vernal pools Moisture: moist. Recorded from Solano.	Apr-May Annual Herb	None: no suitable habitat present.

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Brassicaceae - Mustard Family				
Arabis blepharophylla coast rock cress	Federal: none State: none CNPS: 4.3 CNDDB: G4/S4 Other: DFG: SP	Occurs in broadleafed upland forest, coastal bluff scrub, coastal prairie, coastal scrub, mixed evergreen forest, northern coastal scrub. Recorded from Contra Costa, Marin, Monterey, San Francisco, San Mateo, Santa Cruz, Sonoma.	Feb-May Perennial Herb	None: no suitable habitat present.
Erysimum capitatum ssp. *angustatum* Contra Costa wallflower	Federal: FE State: SE CNPS: 1B.1 CNDDB: G5T1/S1 Other: DFG: SP	Occurs in inland dunes. Recorded from Contra Costa. Recorded from within 1 mile of project site..	Mar-Jul Perennial Herb	None: no suitable habitat present.
Streptanthus albidus ssp. *peramoenus* most beautiful jewel-flower	Federal: none State: none CNPS: 1B.2 CNDDB: G2T2/S2 Other: DFG: SP	Occurs in chaparral, cismontane woodland, valley and foothill grassland. Substrate: serpentinite. Recorded from Alameda, Contra Costa, Monterey, Santa Clara, San Luis Obispo.	Mar-Oct Annual Herb	None: no suitable habitat present.
Streptanthus hispidus Mt. Diablo jewel-flower	Federal: none State: none CNPS: 1B.3 CNDDB: G2/S2 Other: DFG: SP	Occurs in chaparral, valley and foothill grassland Substrate: rocky. Recorded from Contra Costa.	Mar-Jun Annual Herb	None: no suitable habitat present.
Tropidocarpum capparideum caper-fruited tropidocarpum	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in valley and foothill grassland (alkaline hills). Substrate: alkaline. Recorded from Alameda, Contra Costa, Glenn, Monterey, San Joaquin, San Luis Obispo, Santa Clara. Additional distribution: Rediscovered in 2000 on Ft. Hunter Liggett. Presumed extirpated in Alameda, Contra Costa, Glenn, Santa Clara and San Joaquin counties.	Mar-Apr Annual Herb	None: no suitable habitat present.

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Bryaceae				
Anomobryum julaceum slender silver-moss	Federal: none State: none CNPS: 4.2 CNDDB: G5?/S2 Other: DFG: SP	Occurs in broadleafed upland forest, lower montane coniferous forest, North Coast coniferous forest. Moisture: damp soil and rock on outcrops, Habitats Note: usually on roadcuts. Recorded from Butte, Contra Costa, Humboldt, Los Angeles, Mariposa, Santa Barbara, Santa Cruz, Shasta, Sonoma.Also recorded from Oregon.	n/a Moss	None: no suitable habitat present.
Campanulaceae - Bellflower Family				
Campanula exigua chaparral harebell	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in chaparral. Substrate: rocky, usually serpentinite. Recorded from Alameda, Contra Costa, San Benito, Santa Clara, Stanislaus.	May-Jun Annual Herb	None: no suitable habitat present.
Downingia pusilla dwarf downingia	Federal: none State: none CNPS: 2B.2 CNDDB: GU/S2 Other: DFG: SP	Occurs in foothill woodland, valley and foothill grassland, vernal pools Moisture: moist, Habitats Note: clay. Recorded from Mariposa, Merced, Napa, Placer, Sacramento, Solano, Sonoma, Stanislaus, Tehama, Yuba.Also recorded from South America.	Mar-May Annual Herb	None: no suitable habitat present.
Legenere limosa legenere	Federal: none State: none CNPS: 1B.1 CNDDB: G2/S2 Other: DFG: SP	Occurs in vernal pools Moisture: vernally-flooded. Recorded from Lake, Napa, Placer, Sacramento, San Mateo, Shasta, Solano, Sonoma, Stanislaus, Tehama, Yuba.	Apr-Jun Annual Herb	None: no suitable habitat present.

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Chenopodiaceae - Goosefoot Family				
Atriplex cordulata var. *cordulata* heartscale	Federal: none State: none CNPS: 1B.2 CNDDB: G3T2/S2 Other: DFG: SP	Occurs in chenopod scrub, meadows, seeps, valley and foothill grassland (sandy). Substrate: saline or alkaline. Recorded from Alameda, Butte, Contra Costa, Fresno, Glenn, Kern, Kings, Madera, Merced, San Joaquin, Solano, Stanislaus, Tulare, Yolo.	Apr-Oct Annual Herb	None: no suitable habitat present.
Atriplex coronata var. *coronata* crownscale	Federal: none State: none CNPS: 4.2 CNDDB: G4T3/S3 Other: DFG: SP	Occurs in chenopod scrub, shadscale scrub, valley and foothill grassland, vernal pools vernally-flooded, alkaline, Habitats Note: alkaline. Recorded from Alameda, Contra Costa, Fresno, Glenn, Kern, Kings, Merced, Monterey, San Joaquin, San Luis Obispo, Solano, Stanislaus.	Mar-Oct Annual Herb	None: no suitable habitat present.
Atriplex depressa brittlescale	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in chenopod scrub, meadows, seeps, playas, valley and foothill grassland, vernal pools. Substrate: clay, alkaline. Recorded from Alameda, Colusa, Contra Costa, Fresno, Glenn, Kern, Merced, Solano, Stanislaus, Tulare, Yolo.	Apr-Oct Annual Herb	None: no suitable habitat present.
Extriplex joaquiniana San Joaquin spearscale	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in chenopod scrub, meadows, playas, seeps, valley and foothill grassland Substrate: alkaline. Recorded from Alameda, Colusa, Contra Costa, Fresno, Glenn, Merced, Monterey, Napa, San Benito, San Joaquin, San Luis Obispo, Santa Clara, Solano, Tulare, Yolo. Additional distribution: presumed extirpated in Santa Clara, San Joaquin, and Tulare counties; questionable in San Luis Obispo County.	Apr-Oct Annual Herb	None: no suitable habitat present.

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Convolvulaceae - Morning-glory Family				
Convolvulus simulans small-flowered morning-glory	Federal: none State: none CNPS: 4.2 CNDDB: G4/S4 Other: DFG: SP	Occurs in chaparral, coastal sage scrub, coastal scrub, northern coastal scrub, valley and foothill grassland Substrate: serpentine, Habitats Note: clay. Recorded from Contra Costa, Kern, Los Angeles, Orange, Riverside, San Benito, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Stanislaus.San Clemente Island, Santa Catalina Island, Santa Cruz Island.Also recorded from Baja California.	Mar-Jul Annual Herb	None: no suitable habitat present.
Ericaceae - Heath Family				
Arctostaphylos auriculata Mt. Diablo manzanita	Federal: none State: none CNPS: 1B.3 CNDDB: G2/S2 Other: DFG: SP	Occurs in chaparral (sandstone), cismontane woodland Substrate: sedimentary sandstone. Recorded from Contra Costa.	Jan-Mar Shrub (evergreen)	None: no suitable habitat present.
Arctostaphylos manzanita ssp. *laevigata* Contra Costa manzanita	Federal: none State: none CNPS: 1B.2 CNDDB: G5T2/S2 Other: DFG: SP	Occurs in chaparral Habitats Note: rocky. Recorded from Contra Costa.	Jan-Apr Shrub (evergreen)	None: no suitable habitat present.
Fabaceae - Legume Family				
Astragalus tener var. *tener* alkali milk-vetch	Federal: none State: none CNPS: 1B.2 CNDDB: G2T2/S2 Other: DFG: SP	Occurs in playas, valley and foothill grassland (adobe clay), vernal pools Substrate: adobe clay, alkaline. Recorded from Alameda, Contra Costa, Merced, Monterey, Napa, San Benito, San Francisco, San Joaquin, Santa Clara, Solano, Sonoma, Stanislaus, Yolo. Additional distribution: presumed extirpated in Contra Costa, Monterey, San Benito, Santa Clara, San Francisco, San Joaquin, Sonoma, and Stanislaus counties.	Mar-Jun Annual Herb	None: no suitable habitat present.

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Lathyrus jepsonii var. *jepsonii* Delta tule pea	Federal: none State: none CNPS: 1B.2 CNDDB: G5T2/S2 Other: DFG: SP	Occurs in marshes and swamps (freshwater and brackish). Recorded from Contra Costa, Napa, Sacramento, San Joaquin, Solano, Sonoma, Yolo. Recorded from within 1 mile of project site..	May-Sep Perennial Herb	Not Expected: marginally suitable habitat present.
Trifolium hydrophilum saline clover	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in marshes and swamps, valley and foothill grassland (mesic, alkaline), vernal pools. Recorded from Alameda, Colusa, Monterey, Napa, San Benito, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma. Additional distribution: questionable in Colusa County.	Apr-Jun Annual Herb	None: no suitable habitat present.
Grimmiaceae				
Grimmia torenii Toren's grimmia	Federal: none State: none CNPS: 1B.3 CNDDB: G2/S2 Other:	Occurs in chaparral, cismontane woodland, lower montane coniferous forest. Substrate: rocky, boulders, rock walls, carbonate and volcanic., Habitats Note: openings. Recorded from Contra Costa, Colusa, Lake, Mendocino, Monterey, Santa Cruz, San Mateo.	Moss	None: no suitable habitat present.
Juglandaceae - Walnut Family				
Juglans hindsii Northern California black walnut	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in riparian forest, riparian woodland. Recorded from Contra Costa, Lake, Napa, Sacramento, Solano, Yolo. Additional distribution: presumed extirpated in Sacramento, Solano and Yolo counties; questionable occurrence in Lake County.	Apr-May Tree (deciduous)	Absent no suitable habitat present. Would have been detectable during present survey.

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Liliaceae - Lily Family				
Calochortus pulchellus Mt. Diablo fairy-lantern	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in chaparral, cismontane woodland, riparian woodland, valley and foothill grassland. Recorded from Alameda, Contra Costa, Solano.	Apr-Jun Perennial Herb (bulbiferous)	None: no suitable habitat present.
Fritillaria agrestis stinkbells	Federal: none State: none CNPS: 4.2 CNDDB: G3/S3 Other: DFG: SP	Occurs in chaparral, cismontane woodland, foothill woodland, pinyon and juniper woodland, valley and foothill grassland. Substrate: clay, sometimes serpentinite. Recorded from Alameda, Contra Costa, Fresno, Kern, Mariposa, Mendocino, Monterey, Placer, Sacramento, San Benito, San Luis Obispo, San Mateo, Santa Barbara, Santa Cruz, Stanislaus, Tuolumne, Ventura.	Mar-Jun Perennial Herb (bulbiferous)	None: no suitable habitat present.
Fritillaria liliacea fragrant fritillary	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in cismontane woodland, coastal prairie, coastal scrub, valley and foothill grassland Substrate: often serpentinite. Recorded from Alameda, Contra Costa, Marin, Monterey, San Benito, San Francisco, San Mateo, Santa Clara, Solano, Sonoma.	Feb-Apr Perennial Herb (bulbiferous)	None: no suitable habitat present.
Linaceae - Flax Family				
Hesperolinon breweri Brewer's western flax	Federal: none State: none CNPS: 1B.2 CNDDB: G2?/S2? Other: DFG: SP	Occurs in chaparral, cismontane woodland, valley and foothill grassland Substrate: usually serpentinite. Recorded from Contra Costa, Napa, Solano.	May-Jul Annual Herb	None: no suitable habitat present.

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Malvaceae - Mallow Family				
Hibiscus lasiocarpus var. *occidentalis* woolly rose-mallow	Federal: none State: none CNPS: 1B.2 CNDDB: G5T3/S3 Other: DFG: SP	Occurs in freshwater marsh, marshes and swamps. Habitats Note: also in riprap on levees. Recorded from Butte, Colusa, Contra Costa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Yolo.	Jun-Sep Perennial Herb (rhizomatous)	Absent marginally suitable habitat present. Would have been detectable during present survey.
Malacothamnus hallii Hall's bush-mallow	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in chaparral, coastal scrub. Recorded from Contra Costa, Mendocino, Merced, San Mateo, Santa Clara, Stanislaus, Lake.	May-Oct Shrub (evergreen)	None: no suitable habitat present.
Sidalcea keckii Keck's checkerbloom	Federal: FE State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in cismontane woodland, foothill woodland, valley and foothill grassland Substrate: serpentine. Recorded from Fresno, Merced, Tulare. Additional distribution: also possibly in Colusa, Napa, Solano and Yolo counties.	Apr-May Annual Herb	None: no suitable habitat present.
Montiaceae - Montia Family				
Calandrinia breweri Brewer's calandrinia	Federal: none State: none CNPS: 4.2 CNDDB: G4/S4 Other: DFG: SP	Occurs in chaparral, coastal scrub Substrate: sandy or loamy, Habitats Note: disturbed sites and burns. Recorded from Contra Costa, Los Angeles, Marin, Mariposa, Mendocino, Monterey, Napa, San Bernardino, San Diego, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Sonoma, Ventura. Santa Cruz Island, Santa Rosa Island. Also recorded from Baja California.	Mar-Jun Annual Herb	None: no suitable habitat present.

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Onagraceae - Evening Primrose Family				
Oenothera deltoides ssp. *howellii* Antioch Dunes evening-primrose	Federal: FE State: SE CNPS: 1B.1 CNDDB: G5T1/S1 Other: DFG: SP	Occurs in inland dunes. Recorded from Contra Costa, Sacramento. Recorded from within 1 mile of project site..	Mar-Sep Perennial Herb	None: no suitable habitat present.
Orobanchaceae - Broomrape Family				
Chloropyron molle ssp. *hispidum* hispid bird's-beak	Federal: none State: none CNPS: 1B.1 CNDDB: G2T2/S2 Other: DFG: SP	Occurs in alkali sink, meadows, playas, valley and foothill grassland Substrate: alkaline, Habitats Note: alkaline. Recorded from Alameda, Kern, Merced, Placer, Solano.	Jun-Sep Annual Herb, Hemiparasitic	None: no suitable habitat present.
Chloropyron molle ssp. *molle* soft bird's-beak	Federal: FE State: SR CNPS: 1B.2 CNDDB: G2T1/S1 Other: DFG: SP	Occurs in coastal salt marsh. Recorded from Contra Costa, Marin, Napa, Sacramento, Solano, Sonoma. Additional distribution: presumed extiprated in Marin, Sacramento, and Sonoma counties.	Jul-Nov Annual Herb, Hemiparasitic	None: no suitable habitat present.
Cordylanthus nidularius Mt. Diablo bird's-beak	Federal: none State: SR CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in chaparral. Substrate: serpentine. Recorded from Contra Costa.	Jul-Aug Annual Herb, Hemiparasitic	None: no suitable habitat present.

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Papaveraceae - Poppy Family				
Eschscholzia rhombipetala diamond-petaled California poppy	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in valley and foothill grassland. Substrate: alkaline, clay. Recorded from Alameda, Colusa, Contra Costa, San Joaquin, San Luis Obispo, Stanislaus. Additional distribution: presumed extirpated in Contra Costa and Colusa counties.	Mar-Apr Annual Herb	None: no suitable habitat present.
Poaceae - Grass Family				
Neostapfia colusana Colusa grass	Federal: FT State: SE CNPS: 1B.1 CNDDB: G2/S2 Other: DFG: SP	Occurs in vernal pools Moisture: vernally-flooded. Recorded from Colusa, Merced, Solano, Stanislaus, Yolo.	May-Aug Annual Herb	None: no suitable habitat present.
Puccinellia simplex California alkali grass	Federal: none State: none CNPS: 1B.2 CNDDB: G3/S2 Other:	Occurs in chenopod scrub, meadows, seeps, valley and foothill grassland, vernal pools. Sinks, flats, and lake margins. Moisture: vernally mesic, Habitats Note: alkaline. Recorded from Alameda, Butte, Colusa, Contra Costa, Fresno, Glenn, Kern, Lake, Los Angeles, Madera, Merced, Napa, San Bernardino, San Luis Obispo, Santa Clara, Santa Cruz, Solano, Stanislaus, Tulare, Yolo. Additional distribution: Presumed extirpated in Kings County.	Mar-May Annual Herb	None: no suitable habitat present.
Polemoniaceae - Phlox Family				
Collomia diversifolia serpentine collomia	Federal: none State: none CNPS: 4.3 CNDDB: G4/S4 Other: DFG: SP	Occurs in chaparral, cismontane woodland, foothill woodland Substrate: serpentine. Recorded from Colusa, Contra Costa, Glenn, Lake, Mendocino, Napa, Shasta, Stanislaus, Yolo.	May-Jun Annual Herb	None: no suitable habitat present.

Potentially Occurring Special Status Plant Species

Wood Biological Consulting

FAMILY

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Eriastrum ertterae Lime Ridge eriastrum	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other:	Occurs in chaparral. Substrate: alkaline or semi-alkaline, sandy, Habitats Note: openings or edges. Recorded from Contra Costa. Additional distribution: known only from the Lime Ridge area.	Jun-Jul Annual Herb	None: no suitable habitat present.
Navarretia gowenii Lime Ridge navarretia	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other:	Occurs in chaparral. Recorded from Contra Costa, Stanislaus. Additional distribution: Known only from four occurrences; Lime Ridge, Walnut Creek (discovered 1998) and Quinto Canyon, (Stanislaus).	May-Jun Annual Herb	None: no suitable habitat present.
Navarretia heterandra Tehama navarretia	Federal: none State: none CNPS: 4.3 CNDDB: G4/S4 Other: DFG: SP	Occurs in valley and foothill grassland, vernal pools Moisture: moist. Recorded from Butte, Colusa, Lake, Shasta, Tehama, Trinity, Yuba.Also recorded from Oregon.	Apr-Jun Annual Herb	None: no suitable habitat present.
Navarretia leucocephala ssp. *bakeri* Baker's navarretia	Federal: none State: none CNPS: 1B.1 CNDDB: G4T2/S2 Other: DFG: SP	Occurs in cismontane woodland, lower montane coniferous forest, meadows, seeps, valley and foothill grassland, vernal pools Moisture: mesic, Habitats Note: clay. Recorded from Colusa, Glenn, Lake, Lassen, Marin, Mendocino, Napa, Solano, Sonoma, Sutter, Tehama, Yolo.	Apr-Jul Annual Herb	None: no suitable habitat present.
Navarretia nigelliformis ssp. *nigelliformis* adobe navarretia	Federal: none State: none CNPS: 4.2 CNDDB: G4T3/S3 Other:	Occurs in valley and foothill grassland, vernal pools. Moisture: vernally mesic,Substrate: clay, sometimes serpentinite, Recorded from Alameda, Butte, Colusa, Contra Costa, Fresno, Kern, Merced, Monterey, Placer, Sutter, Tulare.	Apr-Jun Annual Herb	None: no suitable habitat present.

Potentially Occurring Special Status Plant Species

Wood Biological Consulting

FAMILY

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Navarretia nigelliformis ssp. *radians* shining navarretia	Federal: none State: none CNPS: 1B.2 CNDDB: G4T2/S2 Other: DFG: SP	Occurs in cismontane woodland, foothill woodland, valley and foothill grassland, vernal pools Moisture: vernally-flooded. Recorded from Alameda, Contra Costa, Fresno, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo.	May-Jul Annual Herb	None: no suitable habitat present.
Polygonaceae - Buckwheat Family				
Eriogonum nudum var. *psychicola* Antioch Dunes buckwheat	Federal: none State: none CNPS: 1B.1 CNDDB: G5T1/S1 Other:	Occurs in inland dunes. Recorded from Contra Costa. Additional distribution: Known only from the Antioch sand dunes.	Jul-Oct Perennial Herb	None: no suitable habitat present.
Eriogonum truncatum Mt. Diablo buckwheat	Federal: none State: none CNPS: 1B.1 CNDDB: G1/S1 Other: DFG: SP	Occurs in chaparral, coastal scrub, valley and foothill grassland Substrate: sandy. Recorded from Alameda, Contra Costa, Solano. Additional distribution: rediscovered in May 2005 in Mount Diablo State Park. Presumed extirpated in Solano County.	Apr-Dec Annual Herb	None: no suitable habitat present.
Potamogetonaceae - Pondweed Family				
Potamogeton zosteriformis eel-grass pondweed	Federal: none State: none CNPS: 2B.2 CNDDB: G5/S3 Other: DFG: SP	Occurs in freshwater marsh, marshes and swamps. Substrate: soft sediment, Habitats Note: in water to 12' deep. Recorded from Contra Costa, Lake, Lassen, Modoc, Shasta.Also recorded from Idaho, Oregon, Utah, Washington.	Jun-Jul Annual Herb, Aquatic	Not Expected: marginally suitable habitat present. Site is outside of species' range.

Potentially Occurring Special Status Plant Species

Wood Biological Consulting

FAMILY

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Stuckenia filiformis ssp. *alpina* slender-leaved pondweed	Federal: none State: none CNPS: 2B.2 CNDDB: G5T5/S3 Other: DFG: SP	Occurs in marshes and swamps. Moisture: shallow, freshwater. Recorded from Alameda, Butte, Contra Costa, El Dorado, Lassen, Mariposa, Merced, Modoc, Mono, Placer, San Mateo, Santa Clara, Shasta, Sierra, Solano, Sonoma. Additional distribution: presumed extirpated from Santa Clara County.Also recorded from Arizona, Nevada, Oregon, Washington.	May-Jul Perennial Herb (rhizomatous), Aquatic	Not Expected: marginally suitable habitat present. Would have been detectable during present survey.
Pottiaceae				
Triquetrella californica coastal triquetrella	Federal: none State: none CNPS: 1B.2 CNDDB: G2/S2 Other: DFG: SP	Occurs in coastal bluff scrub, coastal scrub. Substrate: soil. Recorded from Contra Costa, Del Norte, Marin, Mendocino, San Diego, San Francisco, San Mateo, Sonoma.Also recorded from Oregon.	n/a Moss	None: no suitable habitat present.
Primulaceae - Primrose Family				
Androsace elongata ssp. *acuta* California androsace	Federal: none State: none CNPS: 4.2 CNDDB: G5?T3T4/S3S4 Other: DFG: SP	Occurs in chaparral, cismontane woodland, coastal scrub, meadows, seeps, pinyon and juniper woodland, valley and foothill grassland Moisture: dry. Recorded from Alameda, Colusa, Contra Costa, Fresno, Glenn, Kern, Los Angeles, Merced, Riverside, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Siskiyou, Stanislaus, Tehama.Also recorded from Oregon, Baja California.	Mar-Jun Annual Herb	None: no suitable habitat present.
Ranunculaceae - Buttercup Family				
Delphinium californicum ssp. *interius* Hospital Canyon larkspur	Federal: none State: none CNPS: 1B.2 CNDDB: G3T3/S3 Other: DFG: SP	Occurs in chaparral (openings), cismontane woodland (mesic), coastal scrub Moisture: moist. Recorded from Alameda, Contra Costa, Merced, San Benito, San Joaquin, Santa Clara, Stanislaus.	Apr-Jun Perennial Herb	None: no suitable habitat present.

Potentially Occurring Special Status Plant Species

Wood Biological Consulting

FAMILY

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Blooming Time Life Form	Potential For Occurrence On Site
Myosurus minimus ssp. *apus* little mousetail	Federal: none State: none CNPS: 3.1 CNDDB: G5T2Q/S2 Other: DFG: SP	Occurs in valley and foothill grassland, vernal pools vernally-flooded, alkaline, Habitats Note: alkaline. Recorded from Alameda, Butte, Colusa, Contra Costa, Kern, Riverside, San Bernardino, San Diego, Solano, Stanislaus, Tulare.Also recorded from Baja California, Oregon.	Mar-Jun Annual Herb	None: no suitable habitat present.
Ranunculus lobbii Lobb's aquatic buttercup	Federal: none State: none CNPS: 4.2 CNDDB: G4/S3 Other: DFG: SP	Occurs in cismontane woodland, North Coast coniferous forest, valley and foothill grassland, vernal pools Moisture: mesic. Recorded from Alameda, Contra Costa, Marin, Mendocino, Napa, Solano, Sonoma, Santa Cruz, San Mateo.Also recorded from Oregon.	Feb-May Annual Herb, Aquatic	None: no suitable habitat present.
Rubiaceae - Madder Family				
Galium andrewsii ssp. *gatense* serpentine bedstraw	Federal: none State: none CNPS: 4.2 CNDDB: G5T3/S3 Other: DFG: SP	Occurs in chaparral, cismontane woodland, foothill woodland, lower montane coniferous forest, yellow pine forest Substrate: serpentine. Recorded from Alameda, Contra Costa, Fresno, Monterey, San Benito, San Luis Obispo, Santa Clara.	Apr-Jul Perennial Herb	None: no suitable habitat present.
Scrophulariaceae - Figwort Family				
Limosella australis Delta mudwort	Federal: none State: none CNPS: 2B.1 CNDDB: G4G5/S2 Other: DFG: SP	Occurs in brackish and freshwater marshes and swamps, and riparian scrub. Moisture: wet,Substrate: usually on mud banks, Recorded from Contra Costa, Sacramento, San Joaquin, Solano.Also recorded from Oregon. Recorded from within 1 mile of project site..	May-Aug Perennial Herb (stoloniferous)	Not Expected: marginally suitable habitat present. Would have been detectable during present survey.

ATTACHMENT C

SPECIAL-STATUS ANIMAL SPECIES EVALUATED FOR THE CARBON CAPTURE AND MINERALIZATION PROJECT, 895 E. THIRD STREET, PITTSBURG, CA

Special-status Animal Species

Wood Biological Consulting

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Agelaius tricolor tricolored blackbird	Federal none State SCE Other ABC: WL BLM: S DFW: SSC FWS: BCC; MBTA Global/State Rank: G2G3/S1S2	Highly colonial species. Requires open water, protected nesting substrate, and foraging areas with insect prey within a few km of the colony. Greatest concentrations are in the Central Valley and vicinity. Largely endemic to California. DFG listing covers nesting colonies only.	None: no suitable nesting habitat present.
Ambystoma californiense California tiger salamander - Central Calif. DPS	Federal FT State ST Other DFW: WL Global/State Rank: G2G3/S2S3	Needs underground refuges, especially ground squirrel burrows and vernal pools or other seasonal water sources for breeding. Recorded from Alameda, Amador, Butte, Calaveras, Contra Costa, Fresno, Kern, Kings, Madera, Mariposa, Merced, Monterey, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Solano, Stanislaus, Sutter, Tulare, Yolo counties.	None: no suitable habitat present.
Andrena blennospermatis Blennosperma vernal pool andrenid bee	Federal none State none Other DFW: SA Global/State Rank: G2/S2	Solitary ground-nesting bee inhabiting upland areas near vernal pools. Host plant is Blennosperma. Recorded from Contra Costa, El Dorado, Lake, Placer, Sacramento, San Joaquin, Solano, Sonoma, Tehama, Yolo counties. Additional distribution: inner Coast Ranges.	None: no suitable habitat present. No host plants present.
Anniella pulchra Northern California legless lizard	Federal none State none Other DFW: SSC FS: S Global/State Rank: G3/S3	Occurs in chaparral, coastal dunes and coastal scrub. Inhabits sandy or loose loamy soils under sparse vegetation. Prefers soils with a high moisture content. Recorded from Alameda, Contra Costa, Fresno, Kern, Los Angeles, Madera, Merced, Merced, Monterey, San Benito, San Joaquin, San Luis Obispo, Santa Barbara, Santa Cruz, Tulare counties.	None: no suitable habitat present.

Special-status Animal Species

Wood Biological Consulting

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Anthicus antiochensis Antioch Dunes anthicid beetle	Federal none State none Other DFW: SA Global/State Rank: G1/S1	Interior sand dunes and sand bars. Known to occupy small sand deposits, including dredge spoils. Recorded from Contra Costa, Glenn, Shasta, Solano, Sutter, Tehama counties. Additional distribution: extirpated from the Antioch Dunes, the species' type locality.	None: no suitable habitat present.
Anthicus sacramento Sacramento anthicid beetle	Federal none State none Other DFW: SA Global/State Rank: G1/S1	Known to occupy small sand deposits, including dredge spoils. Recorded from Sacramento, Solano counties. Additional distribution: restricted to sand dune areas of the Sacramento-San Joaquin River Delta.	None: no suitable habitat present.
Antrozous pallidus pallid bat	Federal none State none Other BLM: S DFW: SSC FS: S Global/State Rank: G5/S3 WBWG: H	Inhabits rocky terrain in open areas in lowlands, foothills and mountainous areas near water throughout California below 2,000 meters. Roosts in caves, rock crevices, mines, hollow trees, buildings and bridges in arid regions in low numbers (<200). Active from March-November; migrates in some areas, but may hibernate locally. Recorded from Calaveras, Imperial, Inyo, Kern, Lake, Marin, Mariposa, Mono, Napa, Orange, Riverside, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Siskiyou, Sonoma, Tuolumne counties. Also from Arizona, Nevada, New Mexico, Oregon, Washington.	None: no suitable roosting habitat present.
Apodemia mormo langei Lange's metalmark butterfly	Federal FE State none Other DFW: SA Global/State Rank: G5T1/S1	Inhabits stabilized dunes. Primary host plant is Eriogonum nudum var. auriculatum. Feeds on nectar of other wildflowers, as well as host plant. Recorded from Contra Costa County. Additional distribution: endemic to Antioch Dunes.	None: no suitable habitat present. No host plants present.

Special-status Animal Species

Wood Biological Consulting

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Aquila chrysaetos golden eagle	Federal none State none Other CDF: S DFW: FP, WL FWS: BCC, BEPA, MBTA Global/State Rank: G5/S3	Nests and winters in rolling foothills and mountain areas in sage-juniper flats and deserts. Nests on cliff-walled canyons and large trees in open areas. DFW listing covers nesting and wintering birds only.	None: no suitable nesting habitat present.
Archoplites interruptus Sacramento perch	Federal none State none Other DFW: SSC Global/State Rank: G2G3/S1	Common in ponds and impoundments. Prefers warm water. Aquatic vegetation is essental for young. Tolerates wide range of physico-chemical water conditions. Freshwater. Historically found in the sloughs, slow-moving rivers, and lakes of the Central Valley. Recorded from Contra Costa, Lake, Sacramento counties. Additional distribution: native range is Sacramento-San Joaquin, Pajaro, and Salinas River drainages, and Clear Lake.	Not expected: marginally suitable habitat present. Water in New York Slough is likely unsuitable.
Ardea herodias great blue heron	Federal none State none Other CDF: S DFW: SA FWS: MBTA Global/State Rank: G5/S4	Nests colonially in tall trees, cliffsides, and sequestered spots on marshes. Rookery sites are usually in close proximity to foraging areas such as marshes, lake margins, tide-flats, rivers and streams, wet meadows. DFG listing covers nesting colonies only. Recorded from Alameda, Butte, Del Norte, Humboldt, Imperial, Lake, Lassen, Marin, Merced, Monterey, Placer, Riverside, Sacramento, San Joaquin, San Mateo, Santa Clara, Shasta, Siskiyou, Solano, Sonoma, Stanislaus, Tehama, Tulare, Yolo counties.	None: no suitable nesting habitat present.
Arizona elegans occidentalis California glossy snake	Federal none State none Other DFW: SSC Global/State Rank: G5T2/S2	Habitat generalist reported from a range of scrub and grassland habitats, often with loose or sandy soils. Patchily distributed from the eastern portion of San Francisco Bay, southern San Joaquin Valley, and the Coast, Transverse, and Peninsular Ranges, south to Baja California. Recorded from Alameda, Contra Costa, Fresno, Kern, Los Angeles, Riverside, San Benito, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Ventura counties.	None: no suitable habitat present.

Special-status Animal Species

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Artemisiospiza belli belli Bell's sage sparrow	Federal none State none Other ABC: WL DFW: WL FWS: BCC, MBTA Global/State Rank: G5T2T4/S2?	syn: Amphispiza belli belli Inhabits dry brushy foothills, chaparral and coastal sage scrub habitats west of the Sierras from Redding south into Baja California, Mexico. Breeding begins in March; double-brooded. DFW listing covers nesting birds only.	None: no suitable nesting habitat present.
Asio flammeus short-eared owl	Federal none State none Other ABC: WL Aud: WL DFW: SSC FWS: BCC, MBTA Global/State Rank: G5/S3	Inhabits both freshwater and salt water swamp lands, lowland meadows, and irrigated alfalfa fields. Tule patches/tall grass needed for nesting/daytime seclusion. Nests on dry ground in depressions concealed in vegetation. DFW listing covers nesting birds only. Recorded from Contra Costa, Imperial, Los Angeles, Modoc, Monterey, San Mateo, Solano counties.	None: no suitable nesting habitat present.
Athene cunicularia burrowing owl	Federal none State none Other BLM: S DFW: SSC FWS: BCC; MBTA Global/State Rank: G4/S3	Inhabits open, dry annual or perenial grasslands, deserts and scrublands characterized by low-growing vegetation. Nests underground in mammal burrows, especially those of California ground squirrel. DFW listing covers burrow sites and some wintering sites only.	Possible: marginally suitable habitat present. No suitable burrows detected. See report for discussion.

Special-status Animal Species

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Baeolophus inornatus oak titmouse	Federal none State none Other ABC: WL DFW: SA FWS: BCC, MBTA Global/State Rank: G4/S4	Common species primarily associated with oaks. Occurs in montane hardwood-conifer, montane hardwood, blue, valley, and coastal oak woodlands, and montane and valley foothill riparian habitats. Range encircles San Joaquin Valley, extending east from the coast through Kern Co. onto the western slope of the Sierra Nevada north to Shasta Co. DFW listing covers nesting individuals only.	None: no suitable habitat present.
Bombus caliginosus obscure bumble bee	Federal none State none Other DFW: SA Global/State Rank: G4?/S1S2	Coastal areas, on Baccharis, Cirsium, Lupinus, Lotus, Grindelia and Phacelia. Distributed in coastal areas from northern Washington to southern California. Recorded from Del Norte, Humboldt, Marin, Mendocino, Monterey, San Luis Obispo, San Mateo, Santa Barbara, Sonoma counties. Also from Oregon, Washington.	Not expected: marginally suitable habitat present. Few Baccharis plants present on property, but not in work area.
Bombus crotchii Crotch bumble bee	Federal none State none Other DFW: SA Global/State Rank: G3G4/S1S2	Inhabits open grassland and scrub habitats. Food plants include Antirhinum, Clarkia, Dendromecon, Eschscholzia, Eriogonum, and Phacelia. Nests are often located underground in abandoned rodent nests, or above ground in tufts of grass, old bird nests, rock piles, or cavities in dead trees. Exclusive to coastal California east towards the Sierra-Cascade Crest and into western Nevada. Recorded from Alameda, Calaveras, Colusa, Contra Costa, Fresno, Glenn, Inyo, Kern, Los Angeles, Madera, Mariposa, Mendocino, Merced, Modoc, Monterey, San Benito, San Bernardino, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Siskiyou, Sonoma, Stanislaus, Tehama, Tulare, Tuolumne, Ventura, Yolo counties. Also from SW Nevada.	None: no suitable habitat present.

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Bombus occidentalis western bumble bee	Federal none State none Other DFW: SA FS: S Global/State Rank: G2G3/S1 Xerces: I	Once very common in the western United States and western Canada, but populations from southern British Columbia to Central California have nearly disappeared. Still found in the northern and eastern portions of its historic range. It is an important pollinators of wild flowering plants and crops (e.g., Centaurea, Chrysothamnus, Cirsium, Eriogonum, Melilotus, and Trifolium). Recorded from Alameda, Alpine, Butte, Calaveras, Contra Costa, Del Norte, El Dorado, Fresno, Humboldt, Imperial, Lake, Lassen, Marin, Mariposa, Mendocino, Modoc, Monterey, Napa, Nevada, Placer, Plumas, Sacramento, San Bernardino, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Clara, Santa Cruz, Shasta, Sierra, Siskiyou, Sonoma, Tehama, Trinity, Tulare, Tuolumne, Yolo counties.	Not expected: marginally suitable habitat present. Few host plants present; work areas have been highly modified.
Branchinecta conservatio Conservancy fairy shrimp	Federal FE State none Other DFW: SA Global/State Rank: G2/S2	Inhabits large, turbid, astatic pools located in swales formed by old, braided alluvium, filled by winter/spring rains, and lasting until June. Recorded from Butte, Glenn, Merced, Solano, Stanislaus, Tehama, Yuba counties. Additional distribution: endemic to the grasslands of the northern two-thirds of the Central Valley.	None: no suitable habitat present.
Branchinecta lynchi vernal pool fairy shrimp	Federal FT State none Other DFW: SA Global/State Rank: G3/S3	Inhabits small, clear-water sandstone-depression astatic rain-filled pools and grassed swales, earth slumps, or basalt-flow depression pools. Recorded from Alameda, Butte, Calaveras, Contra Costa, El Dorado, Fresno, Glenn, Kings, Madera, Merced, Monterey, Napa, Placer, Riverside, Sacramento, San Benito, San Joaquin, San Luis Obispo, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Ventura, Yuba counties. Additional distribution: endemic to the grasslands of the Central Valley, Central Coast and South Coast mountains.	None: no suitable habitat present.
Branchinecta mesovallensis midvalley fairy shrimp	Federal none State none Other DFW: SA Global/State Rank: G2/S2S3	Inhabits vernal pools. Recorded from Fresno, Merced, Sacramento counties.	None: no suitable habitat present.

Special-status Animal Species

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Buteo regalis ferruginous hawk	Federal none State none Other AUD: WL BLM: S DFW: WL FWS: BCC; MBTA Global/State Rank: G4/S3S4	Winters in open grasslands, sagebrush flats, desert scrub, low foothills and fringes of pinyon-juniper habitats. Feeds primarily on lagomorphs (rabbits and hares), ground squirrels, and mice. Population trends may follow lagomorph population cycles. Does not nest in California. DFW listing covers wintering birds. General distribution: recorded throughout coastal California, Cetral Valley, San Joaquin Valley, central and southern Sierra Nevada, eastern Sierras and inland deserts.	None: no suitable habitat present. Does not nest in California.
Buteo swainsoni Swainson's hawk	Federal none State ST Other ABC: WLBCC AUD: WL DFW: SA FS: S FWS: BCC; MBTA Global/State Rank: G5/S3	Breeds in stands with few trees in juniper-sage flats, riparian areas and in oak savannah. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations. DFW listing covers nesting birds. Recorded from Butte, Colusa, Contra Costa, Fresno, Glenn, Inyo, Kern, Kings, Lassen, Los Angeles, Madera, Merced, Modoc, Mono, Placer, Sacramento, San Bernardino, San Joaquin, Siskiyou, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo counties.	None: no suitable nesting habitat present.
Callophrys mossii bayensis San Bruno elfin butterfly	Federal FE State none Other DFW: SA Global/State Rank: G4T1/S1 Xerces: C	Inhabits coastal, mountainous areas with grassy ground cover. Colonies are located on steep, north-facing slopes within the fog belt. Larval host plant is Sedum spathulifolium. Recorded from San Mateo, Marin counties. Additional distribution: primary populations are located in the vicinity of San Bruno Mountain.	None: no suitable habitat present.

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Calypte costae Costa's hummingbird	Federal none State none Other AUD: WL DFW: SA FWS: BCC, MBTA Global/State Rank: G5/S4 USBC: Watch List	Primary habitats are desert wash, edges of desert riparian and valley foothill riparian, coastal scrub, desert scrub, desert succulent shrub, lower-elevation chaparral, and palm oasis. Most common and widespread in southern California, but also breeds locally along the western edge of the San Joaquin Valley and the eastern edge of the Sierra Nevada north through Inyo Co. Occurs regularly in spring and summer in Siskiyou Co. DFW listed covers nesting individuals only.	None: no suitable habitat present. Does not breed in Contra Costa County.
Charadrius montanus mountain plover	Federal none State none Other ABC: WLBCC AUD: WL BLM: S DFW: SSC FWS: BCC; MBTA Global/State Rank: G3/S2S3	Winters on short grasslands, freshly plowed fields, newly sprouting grain fields, and sometimes sod farms. Prefers short vegetation, bare ground and flat topography, as well as grazed areas and areas with burrowing rodents. AUD & ABC listings cover full species; DFW listing covers wintering birds only. Recorded from Fresno, Kern, Los Angeles, Merced, San Benito, Solano, Tulare, Yolo counties.	None: no suitable nesting or wintering habitat present.
Coelus gracilis San Joaquin dune beetle	Federal none State none Other BLM: S DFW: SA Global/State Rank: G1/S1	Burrows in the sand of well-developed sand dunes. Inhabits fossil dunes on sandy substrates. Occurs along the western edge of San Joaquin Valley. Extirpated from Antioch Dunes (type locality). Recorded from Contra Costa, Fresno, Kings, San Benito counties.	None: no suitable habitat present.

Special-status Animal Species

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Corynorhinus townsendii townsendii Townsend's big-eared bat	Federal none State SCT Other BLM: S DFW: SSC FS: S Global/State Rank: G3G4/S2 WBWG: H	Inhabits humid coastal regions of northern and central California. Roosts in limestone caves, lava tubes, mines, buildings etc. Will only roost in the open, hanging from walls and ceilings. Roosting sites are limiting. Extremely sensitive to disturbance. BLM, DFW and FS listings cover full species. Recorded from Alameda, Colusa, Humboldt, Lake, Marin, Mendocino, Napa, San Joaquin, Santa Cruz, Yolo counties.	
Coturnicops noveboracensis yellow rail	Federal none State none Other ABC: WLBCC AUD: WL DFW: SSC FWS: BCC; MBTA Global/State Rank: G4/S1S2	The yellow rail is a small, secretive marshbird that runs under vegetation in freshwater marshlands. Breeds in north-central California and Oregon. Summer resident in the eastern Sierra Nevada. Winters in the San Francisco Bay Area. Recorded from Mono County.	None: no suitable nesting habitat present. Does not breed in Contra Costa County.
Desmocerus californicus dimorphus Valley elderberry longhorn beetle	Federal FT State none Other DFW: SA Global/State Rank: G3T2/S2	Prefers to lay eggs in elderberrry (Sambucus mexicana) stems 2-8 inches in diameter. Some preference is shown for "stressed" elderberries. Recorded from Butte, Colusa, El Dorado, Fresno, Glenn, Kern, Madera, Mariposa, Merced, Napa, Placer, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties. Additional distribution: occurs only in the Central Valley of California.	None: no suitable habitat present. No host plants present.

Special-status Animal Species

Wood Biological Consulting

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Dipodomys heermanni berkeleyenis Berkeley kangaroo rat	Federal none State none Other DFW: SA Global/State Rank: G3G4T1/S1	Inhabits open grassy hilltops and open spaces in chaparral and blue oak or gray pine woodlands. Needs fine, deep, well-drained soil for burrowing. Last recorded in 1936. Recorded from Alameda, Contra Costa counties.	None: no suitable habitat present.
Dumontia oregonensis hairy water flea	Federal none State none Other DFW: SA Global/State Rank: G1G3/S1	Vernal pools. Recorded from Sacramento County. Additional distribution: In California, known only from Mather Field. Also from Oregon.	None: no suitable habitat present.
Efferia antiochi Antioch efferian robberfly	Federal none State none Other DFW: SA Global/State Rank: G1G2/S1S2	There is no published information on the life history or behavior of this species, but robber flies are predaceous on other insects, and larvae usually develop in the ground or in rotting wood where they prey upon other insect larvae. Recorded from Contra Costa, Fresno counties. Additional distribution: also recorded from Scout Island in the San Joaquin River.	None: no suitable habitat present.
Elanus leucurus white-tailed kite	Federal none State none Other DFW: FP FWS: MNB, MBTA Global/State Rank: G5/S3S4	Inhabits rolling foothills andvalley margins with scattered oaks and river bottomlands or marshes next to deciduous woodlands. Utilizes open grasslands, meadows, or marshes for foraging close to isolated, dense-topped trees for nesting and perching. DFW listing covers nesting individuals only.	None: no suitable nesting habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Elaphrus viridis delta green ground beetle	Federal FT State none Other DFW: SA Global/State Rank: G1/S1	Inhabits the margins of vernal pools in grasslands. Prefers the sandy mud substrate where it slopes gently into the water, with low-growing vegetation, 25-100% cover. Recorded from Solano County. Additional distribution: occurs between Jepson Prairie and Travis Air Force Base.	None: no suitable habitat present.
Emys marmorata Pacific pond turtle	Federal none State none Other BLM: S DFW: SSC FS: S Global/State Rank: G3G4/S3	A thoroughly aquatic turtle inhabiting ponds, marshes, rivers, streams and irrigation ditches with aquatic vegetation. Needs basking sites and sandy banks or grassy open fields in upland areas for egg-laying. Recorded from Alameda, Amador, Butte, Calaveras, Colusa, Contra Costa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Kern, Kings, Lake, Lassen, Los Angeles, Madera, Marin, Mariposa, Mendocino, Merced, Modoc, Monterey, Napa, Nevada, Orange, Placer, Plumas, Riverside, Sacramento, San Benito, San Bernardino, San Diego, San Francisco, San Joaquin, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Solano, Sonoma, Stanislaus, Tehama, Trinity, Tulare, Tuolumne, Ventura, Yolo, Yuba counties.	Possible: suitable habitat present. Individuals could move along the shoreline. See report for discussion.
Eucerceris ruficeps redheaded sphecid wasp	Federal none State none Other DFW: SA Global/State Rank: G1G3/S1S2	Nests in hard-packed sand utilizing abandoned halictine bee burrows. Occurs on interior dunes. Recorded from Fresno, Stanislaus counties. Additional distribution: central California.	None: no suitable habitat present.
Falco peregrinus anatum American peregrine falcon	Federal Delisted State Delisted Other CDF: S DFW: FP FWS: BCC, MBTA Global/State Rank: G4T4/S3S4	Nests near wetlands, lakes, rivers, or other water bodies, on cliffs, banks, dunes, mounds, and human-made structures. Nests consist of a scrape on a depression or ledge in an open site. DFW listing covers nesting individuals only.	None: no suitable nesting habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Geothlypis trichas sinuosa saltmarsh common yellowthroat	Federal none State none Other DFW: SSC FWS: BCC, MBTA Global/State Rank: G5T3/S3	Inhabits freshwater and salt marshes. Requires thick, continuous cover down to water surface for foraging. Nests in tall grasses, tule patches and willows. Resident of the San Francisco Bay region. Recorded from Alameda, Marin, Napa, San Francisco, San Mateo, Santa Clara, Santa Cruz, Solano, Sonoma counties.	None: no suitable habitat present.
Haematopus bachmani black oystercatcher	Federal none State none Other AUD: WL FWS: BCC; MBTA Global/State Rank: n/a USBC: Watch List	A permanent resident on rocky shores of marine habitats along almost the entire California coast, and on adjacent islands. Uncommon to locally fairly common in northern and central California and on Channel Islands. Rare on mainland coast south of Pt. Conception (Santa Barbara Co.). DFW listing covers nesting birds.	None: no suitable nesting habitat present.
Haliaeetus leucocephalus bald eagle	Federal Delisted State SE Other BLM: S CDF: S DFW: FP FWS: BCC, MBTA Global/State Rank: G5/S3 USFS: S	Found on ocean shores, lake margins, and rivers. Mostly nests within 1 mile of water. Nests in large, old-growth, or dominant live trees with open branches, especially ponderosa pine. Roosts communally in winter. Occasional visitor to San Francisco Bay habitats, primarily in migration and winter. Delisted in 2007 and no longer covered under FESA. DFW listing covers nesting and wintering birds only. Recorded from Alameda, Butte, Calaveras, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Inyo, Lake, Lassen, Los Angeles, Madera, Mendocino, Modoc, Mono, Monterey, Napa, Nevada, Plumas, Riverside, San Bernardino, San Luis Obispo, Santa Barbara, Shasta, Sierra, Siskiyou, Tehama, Trinity, Tuolumne, Yuba counties.	None: no suitable nesting habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Helminthoglypta nickliniana bridgesi Bridges' Coast Range shoulderband snail	Federal none State none Other DFW: SA Global/State Rank: G3T1/S1S2	Prefers to hide under downed branches or logs, or in crevices in boulders and rock outcrops, on open hillsides with tall grasses and weeds. Recorded from Alameda, Contra Costa counties.	None: no suitable habitat present.
Hygrotus curvipes curved-foot hygrotus diving beetle	Federal none State none Other DFW: SA Global/State Rank: G1/S1	Aquatic inhabitant known only from a single,shallow, muddy pool. Recorded from Alameda, Contra Costa counties. Additional distribution: known from Oakley, Byron, Mountain House.	None: no suitable habitat present.
Hypomesus transpacificus delta smelt	Federal FT State SE Other AFS: T DFW: SA Global/State Rank: G1/S1	Occurs in open brackish and freshwater of large channels. Most frequently found at salinities < 2ppt.; seldom found at salinities > 10 ppt. Occurs in the Sacramento-San Joaquin Delta. Occurs seasonally in Suisun Bay, Carquinez Strait and San Pablo Bay. Recorded from Solano, Sacramento, San Joaquin, Solano, Yolo counties.	Possible: suitable habitat present. No suitable breeding or rearing habitat is present at the project site. See report for discussion.
Idiostatus middlekaufi Middlekauf's shieldback katydid	Federal none State none Other DFW: SA Global/State Rank: G1G2/S1	Associated with various native dune shrubs. Recorded from Contra Costa County. Additional distribution: formerly found at the Antioch Dunes, but has not been seen for several decades.	None: no suitable habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Ixobrychus exilis least bittern	Federal none State none Other DFW: SSC FWS: BCC, MBTA Global/State Rank: G5/S2	Nests colonially in marshlands and the borders of ponds and reservoirs providing ample cover. Nests are usually placed low in tules over water. DFW listing covers nesting birds only. Recorded from Inyo County.	None: no suitable nesting habitat present.
Lanius ludovicianus loggerhead shrike	Federal none State none Other DFW: SCC FWS: BCC; MBTA Global/State Rank: G4/S4	Year-round resident in California. Inhabits shrublands and open woodlands associated with grasslands with areas bare ground and impaling sites such as thorny vegetation, multi-stemmed plants or barbed wire. Breeds from early Feb. - July; double- to triple-brooded DFW listing covers nesting individuals only.	Not expected: marginally suitable habitat present. Site is highly modified. See report for details.
Lasiurus blossevillii western red bat	Federal none State none Other DFW: SSC FS: S Global/State Rank: G5/S3 WBWG: H	Roosts primarily in trees, 2-40 feet above the ground. Prefers habitat edges and mosaics with trees that are protected from above and open below, with open areas for foraging. Found from sea level to higher elevations with mixed conifer forests.	None: no suitable roosting habitat present.
Lasiurus cinereus hoary bat	Federal none State none Other DFW: SA Global/State Rank: G5/S4 WBWG: M	Ubiquitous throughout California. A solitary foliage rooster that prefers evergreens, but will use deciduous trees in forested habitats, particularly in edge habitat (Bolster 2005). May forage in small to large groups. Feeds primarily on moths, but will eat a variety of other insects. Migrates great distances.	None: no suitable roosting habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Laterallus jamaicensis coturniculus California black rail	Federal none State ST Other ABC: WL DFW: FP FWS: BCC, MBTA Global/State Rank: G3G4T1/S1	Inhabits freshwater marshes, wet meadows and shallow margins bordering large bays. Also found in freshwater and brackish marshes, near sea level. AUD, FWS & ABC listings cover full species. Recorded from Alameda, Butte, Contra Costa, Imperial, Los Angeles, Marin, Napa, Nevada, Orange, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Cruz, Solano, Sonoma, Yuba counties.	Not expected: no suitable nesting habitat present. Individuals could move along shoreline of project site. See report for details.
Lepidurus packardi vernal pool tadpole shrimp	Federal FE State none Other DFW: SA Global/State Rank: G4/S3S4	Inhabits vernal pools and grassy swales of unplowed grasslands. Tolerant of mud-bottoms and highly turbid conditions. Recorded from Alameda, Butte, Colusa, Fresno, Kings, Merced, Placer, Sacramento, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Yolo, Yuba counties.	None: no suitable habitat present.
Limnodromus griseus short-billed dowitcher	Federal none State none Other FWS: BCC, MBTA Global/State Rank: n/a	Common in saltwater habitats. Common to abundant during spring (late March to mid-May) and fall (mid-July to October) migration along the entire coast of California, where it typically occurs on intertidal mudflats of estuarine habitats.	None: no suitable nesting habitat present.
Limosa fedoa marbled godwit	Federal none State none Other FWS: BCC, MBTA Global/State Rank: n/a	Most common on estuarine mudflats, but also occurs on sandy beaches, open shores, saline emergent wetlands, and adjacent wet upland fields. A common to abundant migrant and winter visitant from mid-August to early May in estuarine habitats the length of the state. A fairly common migrant and winter visitant at the Salton Sea, but generally rare elsewhere in the interior of the state.	None: no suitable nesting habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Linderiella occidentalis California linderiella	Federal none State none Other DFW: SA Global/State Rank: G2G3/S2S3	Inhabits seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan or in sandstone depressions. Found in pools of water with very low alkalinity, conductivity, and total dissolved solids. Recorded from Alameda, Butte, Contra Costa, Fresno, Madera, Merced, Monterey, Placer, Sacramento, San Benito, San Joaquin, San Luis Obispo, Santa Cruz, Shasta, Solano, Sonoma, Stanislaus, Sutter, Tehama, Yuba counties.	None: no suitable habitat present.
Lytta molesta molestan blister beetle	Federal none State none Other DFW: SA Global/State Rank: G2/S2	Associated with grassland habitats and adults are found on various wild flowers or flowers of native shrubs. Recorded from Contra Costa, Fresno, Kern, Madera, Merced, Tulare counties. Additional distribution: inhabits the Central Valley.	None: no suitable habitat present.
Masticophis lateralis euryxanthus Alameda whipsnake	Federal FT State ST Other DFW: SA Global/State Rank: G4T2/S2	Inhabits south-facing slopes and ravines where shrubs form a vegetative mosaic with oak trees and grasses. Restricted to valley-foothill hardwood habitat of the Coast Ranges between Monterey and northern San Francisco Bay. Recorded from Alameda, Contra Costa counties.	None: no suitable habitat present.
Melanerpes lewis Lewis' woodpecker	Federal none State none Other AUD: WL BLM: S DFW: SA FWS: BCC; MBTA Global/State Rank: G4/S4	Requires open habitats with scattered trees and snags with cavities. Cover provided by cavities and foliage of trees and shrubs. An uncommon, local winter resident occurring in open oak savannahs, broken deciduous, and coniferous habitats. Found along eastern slopes of the Coast Ranges south to San Luis Obispo Co. Also winters in the Central Valley, Modoc Plateau, and the Transverse and other Ranges in southern California. Breeds locally along eastern slopes of the Coast Ranges, and in the Sierra Nevada, Warner Mts., Klamath Mts., and in the Cascade Range. DFW listing covers nesting individuals only.	None: no suitable nesting habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Melospiza melodia song sparrow "Modesto population"	Federal none State none Other DFW: SSC FWS: MBTA Global/State Rank: G5/S3?	Moderately dense vegetation to supply cover for nest sites, a source of standing or running water, semiopen canopies to allow light, and exposed ground or leaf litter for foraging. Associated with emergent freshwater marshes dominated by tules and cattails as well as riparian willow thickets. Also may nest in riparian forests of Valley Oak with an understory of blackberry, along vegetated irrigation canals and levees, and in recently planted Valley Oak restoration sites. Recorded from Butte, Colusa, Colusa, Contra Costa, Placer, Sacramento, San Joaquin, Solano, Stanislaus, Sutter, Yolo counties.	None: no suitable nesting habitat present.
Melospiza melodia maxillaris Suisun song sparrow	Federal none State none Other DFW: SSC FWS: BCC; MBTA Global/State Rank: G5T3/S3	Inhabits cattails, tules and other sedges, and pickleweed. Also known to frequent tangles bordering sloughs. Occurs in brackish-water marshes surrounding Suisun Bay. Recorded from Contra Costa, Solano counties.	None: no suitable nesting habitat present.
Metapogon hurdi Hurd's metapogon robberfly	Federal none State none Other DFW: SA Global/State Rank: G1G2/S1S2	Associated primarily with interior sand dunes. Recorded from Contra Costa, Fresno counties. Additional distribution: presumed extirpated from the Antioch Dunes.	None: no suitable habitat present.
Myrmosula pacifica Antioch multilid wasp	Federal none State none Other DFW: SA Global/State Rank: GH/SH	Inhabits interior dunes. This species is probably a synonym of a more widespread mutillid. Thus, this species may not be as unique as was originally believed. Recorded from Contra Costa, Inyo, Solano, Yolo counties.	None: no suitable habitat present.

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	Federal none State none Other DFW: SSC Global/State Rank: G5T2T3/S2S3	One of eleven recognized subspecies. Inhabits oak and riparian woodlands with a well-developed understory in the SF Bay Area. They exhibit high site fidelity and may live in the same nest community for generations. Nest structures are key indicator of their presence and are easily identified by their conical appearance. Recorded from Alameda, Contra Costa, San Francisco, San Mateo, Santa Clara counties.	
Numenius americanus long-billed curlew	Federal none State none Other DFW: WL FWS: BCC; MBTA Global/State Rank: G5/S2	Breeds in upland shortgrass prairies and wet meadows in northeastern California. Inhabits gravelly soils and gently rolling terrain are favored over others. DFW listing covers nesting birds only.	None: no suitable nesting habitat present.
Oncorhynchus mykiss irideus steelhead - Central Valley DPS	Federal FT State none Other AFS: T DFW: SA Global/State Rank: G5T2Q/S2	The Distinct Population Segment includes steelhead inhabiting the Sacramento and San Joaquin Rivers and their tributaries. Also included are river reaches and estuarine areas of the Sacramento-San Joaquin Delta, all waters from Chipps Island westward to Carquinez Bridge, including Honker Bay, Grizzly Bay, Suisun Bay, and Carquinez Strait, all waters of San Pablo Bay westward of the Carquinez Bridge, and all waters of San Francisco Bay (north of the San Francisco/Oakland Bay Bridge) from San Pablo Bay to the Golden Gate Bridge.	
Perdita scituta antiochensis Antioch andrenid bee	Federal none State none Other DFW: SA Global/State Rank: G1T1/S1	Restricted to sand dunes. Active in early fall. Known to visit the flowers of various native plants, especially Eriogonum nudum, Gutierrezia californica, Heterotheca grandiflora, and Lessingia glandulifera. Recorded from Contra Costa County. Additional distribution: Antioch Dunes.	None: no suitable habitat present.

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Perognathus inornatus San Joaquin pocket mouse	Federal none State none Other DFW: SA Global/State Rank: G2G3/S2S3	Occurs in dry, open grasslands or scrub areas on fine-textured soils between 350 and 600 m (1100 and 2000 ft) in the Central and Salinas valleys.	None: no suitable habitat present. Site is outside of the species' range.
Phalacrocorax auritus double-crested cormorant	Federal none State none Other DFW: WL FWS: MBTA Global/State Rank: G5/S4	Nests colonially on coastal cliffs, offshore islands, and along lake margins in the interior of the state. Nests along coast on sequestered islets, usually on ground with sloping surface, or in tall trees along lake margins. DFG listing covers rookery sites only. Recorded from Alameda, Contra Costa, Del Norte, Humboldt, Lake, Lassen, Mariposa, Monterey, Sacramento, San Diego, San Francisco, Santa Barbara, Sonoma, Ventura counties.	None: no suitable nesting habitat present.
Philanthus nasalis Antioch specid wasp	Federal none State none Other DFW: SA Global/State Rank: G1/S1	Associated with sand dunes. Previously known only from the Antioch Dunes. Now known only from inland sandhills of Santa Cruz County. Found on flowers of Eriogonum nudum decurrens, Gnaphalium beneolens, G. "Zayateense", Ericameria. Recorded from Contra Costa, Santa Cruz counties.	None: no suitable habitat present.
Phrynosoma blainvillii coast horned lizard	Federal none State none Other BLM: S DFW: SSC FS: S Global/State Rank: G3G4/S3S4	Inhabits coastal sage scrub and chaparral in arid and semi-arid climate condit. Prefers friable, rocky, or shallow sandy soils. Diet consists of native ants and beetles. Active from April-Oct, with peak April-May. Recorded from Alameda, Butte, Contra Costa, El Dorado, Fresno, Kern, Los Angeles, Madera, Merced, Monterey, Nevada, Orange, Placer, Riverside, San Bernardino, San Diego, San Joaquin, San Luis Obispo, Santa Barbara, Santa Clara, Stanislaus, Tulare, Tuolumne, Ventura, Ventura counties. Also from Mexico.	None: no suitable habitat present.

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Pica nuttalli yellow-billed magpie	Federal none State none Other DFW: SA FWS: BCC, MBTA Global/State Rank: G3G4/S3S4	Inhabits valley foothill hardwood, valley foothill hardwood-conifer, valley foothill riparian, orchard vineyard, cropland, pasture, and urban habitats. A common, yearlong resident of the Central Valley, and coastal mountain ranges south from San Francisco Bay to Santa Barbara Co. Also breeds locally on the coast in Monterey Co., and is casual in winter on the coast north to Sonoma Co. Rare visitor in Shasta Valley, Siskiyou Co. DFW listing covers nesting and communal roost sites.	None: no suitable nesting habitat present.
Picoides nuttallii Nuttall's woodpecker	Federal none State none Other ABC: WL FWS: BCC, MBTA Global/State Rank: n/a	Inhabits oak woodland and mixed riparian woodlands. Forage along bark of trees for insects; also feeds on acorns. Cavity nester. Breeding begins in March; single-brooded.	None: no suitable nesting habitat present.
Pogonichthys macrolepidotus Sacramento splittail	Federal none State none Other DFW: SSC Global/State Rank: GNR/S3	Inhabits slow-moving river sections, dead end sloughs. Requires flooded vegetation for spawning and foraging for young. Inhabits fresh and brackish water. Recorded from Sacramento, Solano, Sonoma, Stanislaus counties. Additional distribution: endemic to the lakes and rivers of the Central Valley, but now confined to the Sacramento-San Joaquin Delta, Suisun Bay and associated marshes.	
Rallus longirostris obsoletus California Ridgway's rail	Federal FE State SE Other ABC: WL DFW: FP FWS: MBTA Global/State Rank: G5T1/S1	Inhabits salt-water and brackish marshes traversed by tidal sloughs in the vicinity of San Francisco Bay. Associated with abundant growths of pickleweed, but feeds away from cover on invertebrates from mud-bottomed sloughs.	None: no suitable habitat present.

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Rana draytonii California red-legged frog	Federal FT State none Other DFW: SSC Global/State Rank: G2G3/S2S3	Inhabits lowlands and foothills in or near permanent sources of deep water with dense, shrubby or emergent riparian vegetation. Requires 11-20 weeks of permanent water for larval development. Must have access to estivation habitat. Recorded from Alameda, Butte, Butte, Calaveras, Contra Costa, El Dorado, Fresno, Glenn, Lake, Los Angeles, Marin, Mariposa, Mendocino, Merced, Monterey, Napa, Nevada, Placer, Plumas, Riverside, San Benito, San Bernardino, San Diego, San Francisco, San Joaquin, San Luis Obispo, San Mateo, Santa Barbara, Santa Clara, Santa Cruz, Shasta, Solano, Sonoma, Stanislaus, Tehama, Tuolumne, Ventura, Yuba counties.	None: no suitable habitat present.
Reithrodontomys raviventris salt-marsh harvest mouse	Federal FE State SE Other DFW: FP Global/State Rank: G1G2/S1S2	Pickleweed (Salicornia) is the primary habitat. Builds loosely organized nests and does not burrow into the ground. Requires higher areas to escape flooding. Restricted to saline emergent wetlands. Recorded from Contra Costa, Marin, Napa, San Mateo, Santa Clara, Solano, Sonoma counties. Additional distribution: San Francisco Bay and its tributaries.	None: no suitable habitat present.
Riparia riparia bank swallow	Federal none State ST Other DFW: SA FWS: MBTA Global/State Rank: G5/S2	Nests colonially, primarily in riparian and other lowland habitats west of the desert. Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole. DFW listing covers nesting colonies only. Recorded from Alameda, Butte, Colusa, Del Norte, El Dorado, Fresno, Glenn, Humboldt, Inyo, Lassen, Modoc, Mono, Monterey, Plumas, Sacramento, San Benito, San Diego, San Francisco, San Luis Obispo, San Mateo, Santa Barbara, Shasta, Siskiyou, Sonoma, Sutter, Tehama, Ventura, Yolo counties.	

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Sorex ornatus sinuosus Suisun shrew	Federal none State none Other DFW: SSC Global/State Rank: G5T1T2Q/S1S2	Inhabits tidal marshes. Require dense low-lying cover and driftweed and other litter above the mean hightide line for nesting and foraging. Recorded from Napa, Solano counties. Additional distribution: northern shores of San Pablo and Suisun bays.	None: no suitable habitat present.
Sphecodogastra antiochensis Antioch Dunes halcitid bee	Federal none State none Other DFW: SA Global/State Rank: G1/S1 Xerces: CI	Ground-nesting bee found in stabilized dunes in open, xeric areas. Host plant is Oenothera deltoides howellii. Recorded from Contra Costa County. Additional distribution: restricted to Antioch Dunes.	None: no suitable habitat present.
Spinus lawrencei Lawrence's goldfinch	Federal none State none Other ABC: WL DFW: SA FWS: BCC; MBTA Global/State Rank: G3G4/S3S4	syn: Carduelis lawrencei Inhabits arid oak/pine woodlands, foothills and chaparral from northern California west of the Sierra Nevada south to Baja California, Mexico. Breeding begins in March; double-brooded . DFW listing covers nesting individuals only.	None: no suitable nesting habitat present.
Spirinchus thaleichthys longfin smelt-San Francisco bay-delta DPS	Federal FC State ST Other DFW: SSC Global/State Rank: G5/S1	Found mostly close to shore, in bays and estuaries, ascending coastal streams to spawn. Anadromous. Occurs in fresh and brackish water, and marine environments.	

Special-status Animal Species

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Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Sternula antillarum browni California least tern	Federal FE State SE Other ABC: WL DFW: FP FWS: MBTA Global/State Rank: G4T2T3Q/S2	Breeds in colonies on bare or sparsely vegetated, flat substrates consisting of sand beaches, alkali flats, land fills, or paved areas. Nests along the coast from San Francisco Bay south to northern Baja California. Listing covers nesting colonies.	None: no suitable nesting habitat present.
Taxidea taxus American badger	Federal none State none Other DFW: SSC Global/State Rank: G5/S3	Most abundant in dry, open stages of most shrub, forest, and herbaceous habitats. Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Excavates its own burrows. General distribution: recorded from every California county except Del Norte.	None: no suitable habitat present.
Thamnophis gigas giant gartersnake	Federal FT State ST Other DFW: SA Global/State Rank: G2/S2	Prefers freshwater marsh and low gradient streams. Has adapted to drainage canals and irrigation ditches. This is the most aquatic of the garter snakes in California. Recorded from Butte, Colusa, Contra Costa, Fresno, Great Basin Floristic Province, Kern, Merced, Sacramento, San Joaquin, Solano, Sutter, Yolo counties.	Not expected: marginally suitable habitat present. See report for discussion.
Tringa flavipes lesser yellowlegs	Federal none State none Other FWS: BCC, MBTA Global/State Rank: n/a	Forages along shallow lacustrine, wet meadow, and estuarine mudflat habitats. It especially prefers flooded fields, drainage ditches, shallow wetlands, and other calm, freshwater habitats. Occurs in California primarily as an uncommon to fairly common fall migrant, and a very uncommon spring migrant. From October to March it is rare to very uncommon; most winter occurrences are from coastal central and southern California.	None: no suitable nesting habitat present.

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Wood Biological Consulting

SORTED BY CLASS

Scientific Name Common Name	Status	Habitat Affinities And Reported Distribution	Potential For Occurrence On Site
Vulpes macrotis mutica San Joaquin kit fox	Federal FE State ST Other DFW: SA Global/State Rank: G4T2/S2	Inhabits annual grasslands or grassy open stages with scattered shrubby vegetation. Needs loose-textured sandy soils for burrowing, and a suitable prey base. Recorded from Alameda, Contra Costa, Fresno, Kern, Kings, Madera, Merced, Monterey, San Benito, Santa Clara, Tulare counties.	None: no suitable habitat present. Site is outside of the species' range.

ATTACHMENT D

EXPLANATION OF RARITY STATUS CODES

EXPLANATION OF RARITY STATUS CODES

ENDANGERED SPECIES ACT (FESA) LISTING CODES

FE = federally listed as Endangered
FT = federally listed as Threatened
FPE = proposed for listing Endangered
FPT = proposed for listing Threatened
FC = federal candidate; former Category 1 candidates
FD/FPD = delisted/proposed for delisting
BCC = Bird Species of Conservation Concern
SC = species of concern; established by NMFS, effective April 15, 2004.

CALIFORNIA ENDANGERED SPECIES ACT (CESA) LISTING CODES

SE = state-listed as Endangered
ST = state-listed as Threatened
SR = state-listed as Rare
SCE = state candidate for listing as Endangered
SCT = state candidate for listing as Threatened
SD/SCD = delisted/State candidate for delisting

GLOBAL (G) AND STATE (S) RARITY_RANKINGS

G1/S1 = Critically imperiled: at high risk of extinction, extremely rare.
G2/S2 = Imperiled: at high risk of extinction, restricted range, very few populations.
G3/S3 = Vulnerable: moderate risk of extinction, restricted range, few populations.
G4/S4 = Apparently secure: uncommon, not rare, possible long-term declines.
G5/S5 = Secure: common, widespread, abundant.
H = All records are historical
Q = Very rare, but taxonomy is questionable
T = Rank assigned to a sub-specific taxon.
X = All records are extirpated (extinct in the wild)

CALIFORNIA RARE PLANT RANKINGS (CRPR)

1A: Plants presumed extinct in CA, rare or extinct elsewhere.
1B: Plants rare, threatened, or endangered in CA and elsewhere.
2A: Plants presumed extirpated in CA but common elsewhere.
2B: Plants rare, threatened or endangered in CA but common elsewhere.
3: Plants for which more information is needed – a review list.
4: Plants of limited distribution – a watch list.
.1 - Seriously endangered in CA
.2 – Fairly endangered in CA
.3 – Not very endangered in CA

OTHER CODES

ABC: WL - American Bird Conservancy Watch List of Birds of Conservation Concern.

AFS - American Fisheries Society categories of risk for marine, estuarine and diadromous fish stocks. Codes: **E**=endangered; **T**=threatened; **V**=vulnerable

AUD: WL - Audubon: Watch List 2007. Bird species facing population decline and/or threats such as loss of breeding and wintering grounds, or species with limited geographic ranges. **R** – Red List, global conservation concern; **Y** – Yellow List, national conservation concern.

BLM: S - Bureau of Land Mgt: Sensitive. Includes species under review by USFWS or NMFS, species whose numbers are declining so rapidly that federal listing may become necessary, species with small and widely dispersed populations, or species inhabiting refugia or other unique habitats.

CDF: S – CA Dept. of Forestry and Fire Protection: Sensitive. Includes species that warrant special protection during timber operations.

DFW: FP - CDFW: Fully Protected. Species protected under §§3511 (birds), 4700 (mammals), 5050 (reptiles and amphibians), and 5515 (fish) of the California Fish and Game Code.

DFW: SA - CDFW: Special Animal. Species included on the CDFW's lists of special animals.

DFW: SP - CDFW: Special Plant. Species included on the CDFW's lists of special plants.

DFW: SSC - CDFW: California Species of Special Concern.

DFW: WL - CDFW: (Watch List): taxa that don't meet SSC criteria but about which there is concern and additional information is needed to clarify status.

FS: S - USDA Forest Service: Sensitive. Species whose population viability is a concern, as evidenced by significant current or predicted downward trends in numbers or density, or in habitat capability that would reduce a species' existing distribution.

FWS: BCC - U.S. Fish and Wildlife Service: Birds of Conservation Concern. Migratory and non-migratory bird species that represent the USFWS's highest conservation priorities.

FWS: BEPA - U.S. Fish and Wildlife Service: Bald Eagle Protection Act.

FWS: MBTA U.S. Fish and Wildlife Service: International Migratory Bird Treaty Act.

FWS: MNB - U.S. Fish and Wildlife Service: Migratory Nongame Birds of Management Concern. Species of concern in the U.S. due to documented or apparent population declines, small or restricted populations, or dependence on restricted or vulnerable habitats.

MMPA – Marin Mammal Protection Act

NMFS: SC - National Marine Fisheries Service: Species of Concern.

WBWG - Western Bat Working Group. Priority for funding, planning or conservation actions. Priority Codes: **H**=high; **MH**=medium-high; **M**=medium; **LM**=low-medium

Xerces - Xerces Society Red List.
Codes: **C**=critically imperiled; **I**=imperiled; **V**=vulnerable; **D**=data deficient

ATTACHMENT E

DATABASE PRINT-OUTS FOR SPECIAL-STATUS SPECIES

California Natural Diversity Database (2019)
USFWS Database (2019)
California Native Plant Society (2019)

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Antioch North, Antioch South, Clayton, Rio Vista, Jersey Island, Brentwood, Birds Landing, Denverton, and Honker Bay 7.5-minute USGS quadrangles

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Amsinckia grandiflora large-flowered fiddleneck	PDBOR01050	Endangered	Endangered	G1	S1	1B.1
Anomobryum julaceum slender silver moss	NBMUS80010	None	None	G5?	S2	4.2
Arctostaphylos auriculata Mt. Diablo manzanita	PDERI04040	None	None	G2	S2	1B.3
Arctostaphylos manzanita ssp. laevigata Contra Costa manzanita	PDERI04273	None	None	G5T2	S2	1B.2
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Atriplex cordulata var. cordulata heartscale	PDCHE040B0	None	None	G3T2	S2	1B.2
Atriplex depressa brittlescale	PDCHE042L0	None	None	G2	S2	1B.2
Blepharizonia plumosa big tarplant	PDAST1C011	None	None	G1G2	S1S2	1B.1
Calochortus pulchellus Mt. Diablo fairy-lantern	PMLIL0D160	None	None	G2	S2	1B.2
Campanula exigua chaparral harebell	PDCAM020A0	None	None	G2	S2	1B.2
Centromadia parryi ssp. congdonii Congdon's tarplant	PDAST4R0P1	None	None	G3T1T2	S1S2	1B.1
Centromadia parryi ssp. parryi pappose tarplant	PDAST4R0P2	None	None	G3T2	S2	1B.2
Chloropyron molle ssp. hispidum hispid salty bird's-beak	PDSCR0J0D1	None	None	G2T1	S1	1B.1
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2
Cicuta maculata var. bolanderi Bolander's water-hemlock	PDAPI0M051	None	None	G5T4T5	S2?	2B.1
Cirsium hydrophilum var. hydrophilum Suisun thistle	PDAST2E1G1	Endangered	None	G2T1	S1	1B.1
Cordylanthus nidularius Mt. Diablo bird's-beak	PDSCR0J0F0	None	Rare	G1	S1	1B.1
Cryptantha hooveri Hoover's cryptantha	PDBOR0A190	None	None	GH	SH	1A

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Delphinium californicum ssp. interius Hospital Canyon larkspur	PDRAN0B0A2	None	None	G3T3	S3	1B.2
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
Eriastrum ertterae Lime Ridge eriastrum	PDPLM030F0	None	None	G1	S1	1B.1
Eriogonum nudum var. psychicola Antioch Dunes buckwheat	PDPGN0849Q	None	None	G5T1	S1	1B.1
Eriogonum truncatum Mt. Diablo buckwheat	PDPGN085Z0	None	None	G1	S1	1B.1
Eryngium jepsonii Jepson's coyote-thistle	PDAPI0Z130	None	None	G2	S2	1B.2
Erysimum capitatum var. angustatum Contra Costa wallflower	PDBRA16052	Endangered	Endangered	G5T1	S1	1B.1
Eschscholzia rhombipetala diamond-petaled California poppy	PDPAP0A0D0	None	None	G1	S1	1B.1
Extriplex joaquinana San Joaquin spearscale	PDCHE041F3	None	None	G2	S2	1B.2
Fritillaria agrestis stinkbells	PMLIL0V010	None	None	G3	S3	4.2
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Grimmia torenii Toren's grimmia	NBMUS32330	None	None	G2	S2	1B.3
Helianthella castanea Diablo helianthella	PDAST4M020	None	None	G2	S2	1B.2
Hesperolinon breweri Brewer's western flax	PDLIN01030	None	None	G2	S2	1B.2
Hibiscus lasiocarpos var. occidentalis woolly rose-mallow	PDMAL0H0R3	None	None	G5T3	S3	1B.2
Isocoma arguta Carquinez goldenbush	PDAST57050	None	None	G1	S1	1B.1
Juglans hindsii Northern California black walnut	PDJUG02040	None	None	G1	S1	1B.1
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Lathyrus jepsonii var. jepsonii Delta tule pea	PDFAB250D2	None	None	G5T2	S2	1B.2
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Lilaeopsis masonii Mason's lilaeopsis	PDAPI19030	None	Rare	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Limosella australis Delta mudwort	PDSCR10030	None	None	G4G5	S2	2B.1
Madia radiata showy golden madia	PDAST650E0	None	None	G3	S3	1B.1
Malacothamnus hallii Hall's bush-mallow	PDMAL0Q0F0	None	None	G2	S2	1B.2
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
Monolopia gracilens woodland woollythreads	PDAST6G010	None	None	G3	S3	1B.2
Navarretia gowenii Lime Ridge navarretia	PDPLM0C120	None	None	G1	S1	1B.1
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
Navarretia nigelliformis ssp. radians shining navarretia	PDPLM0C0J2	None	None	G4T2	S2	1B.2
Oenothera deltoides ssp. howellii Antioch Dunes evening-primrose	PDONA0C0B4	Endangered	Endangered	G5T1	S1	1B.1
Phacelia phacelioides Mt. Diablo phacelia	PDHYD0C3Q0	None	None	G2	S2	1B.2
Plagiobothrys hystriculus bearded popcornflower	PDBOR0V0H0	None	None	G2	S2	1B.1
Potamogeton zosteriformis eel-grass pondweed	PMPOT03160	None	None	G5	S3	2B.2
Puccinellia simplex California alkali grass	PMPOA53110	None	None	G3	S2	1B.2
Sagittaria sanfordii Sanford's arrowhead	PMALI040Q0	None	None	G3	S3	1B.2
Sanicula saxatilis rock sanicle	PDAPI1Z0H0	None	Rare	G2	S2	1B.2
Senecio aphanactis chaparral ragwort	PDAST8H060	None	None	G3	S2	2B.2
Sidalcea keckii Keck's checkerbloom	PDMAL110D0	Endangered	None	G2	S2	1B.1
Streptanthus albidus ssp. peramoenus most beautiful jewelflower	PDBRA2G012	None	None	G2T2	S2	1B.2
Streptanthus hispidus Mt. Diablo jewelflower	PDBRA2G0M0	None	None	G2	S2	1B.3
Stuckenia filiformis ssp. alpina slender-leaved pondweed	PMPOT03091	None	None	G5T5	S2S3	2B.2
Symphyotrichum lentum Suisun Marsh aster	PDASTE8470	None	None	G2	S2	1B.2

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Triquetrella californica coastal triquetrella	NBMUS7S010	None	None	G2	S2	1B.2
Tropidocarpum capparideum caper-fruited tropidocarpum	PDBRA2R010	None	None	G1	S1	1B.1
Viburnum ellipticum oval-leaved viburnum	PDCPR07080	None	None	G4G5	S3?	2B.3

Record Count: 63

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Antioch North, Antioch South, Clayton, Rio Vista, Jersey Island, Brentwood, Birds Landing, Denverton, and Honker Bay 7.5-minute USGS quadrangles

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Andrena blennospermatis Blennosperma vernal pool andrenid bee	IIHYM35030	None	None	G2	S2	
Anniella pulchra northern California legless lizard	ARACC01020	None	None	G3	S3	SSC
Anthicus antiochensis Antioch Dunes anthicid beetle	IICOL49020	None	None	G1	S1	
Anthicus sacramento Sacramento anthicid beetle	IICOL49010	None	None	G1	S1	
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Apodemia mormo langei Lange's metalmark butterfly	IILEPH7012	Endangered	None	G5T1	S1	
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Archoplites interruptus Sacramento perch	AFCQB07010	None	None	G2G3	S1	SSC
Ardea herodias great blue heron	ABNGA04010	None	None	G5	S4	
Arizona elegans occidentalis California glossy snake	ARADB01017	None	None	G5T2	S2	SSC
Asio flammeus short-eared owl	ABNSB13040	None	None	G5	S3	SSC
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	
Bombus crotchii Crotch bumble bee	IIHYM24480	None	None	G3G4	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	None	G2G3	S1	
Branchinecta conservatio Conservancy fairy shrimp	ICBRA03010	Endangered	None	G2	S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Branchinecta lynchi vernal pool fairy shrimp	ICBRA03030	Threatened	None	G3	S3	
Branchinecta mesovallensis midvalley fairy shrimp	ICBRA03150	None	None	G2	S2S3	
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Charadrius montanus mountain plover	ABNNB03100	None	None	G3	S2S3	SSC
Coelus gracilis San Joaquin dune beetle	IICOL4A020	None	None	G1	S1	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Dipodomys heermanni berkeleyensis Berkeley kangaroo rat	AMAFD03061	None	None	G3G4T1	S1	
Dumontia oregonensis hairy water flea	ICBRA23010	None	None	G1G3	S1	
Efferia antiochi Antioch efferian robberfly	IIDIP07010	None	None	G1G2	S1S2	
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Elaphrus viridis Delta green ground beetle	IICOL36010	Threatened	None	G1	S1	
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eucerceris ruficeps redheaded sphecid wasp	IIHYM18010	None	None	G1G3	S1S2	
Falco peregrinus anatum American peregrine falcon	ABNKD06071	Delisted	Delisted	G4T4	S3S4	FP
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Helminthoglypta nickliniana bridgesi Bridges' coast range shoulderband	IMGASC2362	None	None	G3T1	S1S2	
Hygrotus curvipes curved-foot hygrotus diving beetle	IICOL38030	None	None	G1	S1	
Hypomesus transpacificus Delta smelt	AFCHB01040	Threatened	Endangered	G1	S1	
Idiostatus middlekauffi Middlekauff's shieldback katydid	IIORT31010	None	None	G1G2	S1	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lanius ludovicianus loggerhead shrike	ABPBR01030	None	None	G4	S4	SSC
Lasiurus blossevillii western red bat	AMACC05060	None	None	G5	S3	SSC
Lasiurus cinereus hoary bat	AMACC05030	None	None	G5	S4	
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Lepidurus packardi vernal pool tadpole shrimp	ICBRA10010	Endangered	None	G4	S3S4	
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Lytta molesta molestan blister beetle	IICOL4C030	None	None	G2	S2	
Masticophis lateralis euryxanthus Alameda whipsnake	ARADB21031	Threatened	Threatened	G4T2	S2	
Melospiza melodia song sparrow ("Modesto" population)	ABPBXA3010	None	None	G5	S3?	SSC
Melospiza melodia maxillaris Suisun song sparrow	ABPBXA301K	None	None	G5T3	S3	SSC
Metapogon hurdi Hurd's metapogon robberfly	IIDIP08010	None	None	G1G2	S1S2	
Myrmosula pacifica Antioch multilid wasp	IIHYM15010	None	None	GH	SH	
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	AMAFF08082	None	None	G5T2T3	S2S3	SSC
Oncorhynchus mykiss irideus pop. 11 steelhead - Central Valley DPS	AFCHA0209K	Threatened	None	G5T2Q	S2	
Perdita scitula antiochensis Antioch andrenid bee	IIHYM01031	None	None	G1T1	S1	
Perognathus inornatus San Joaquin Pocket Mouse	AMAFD01060	None	None	G2G3	S2S3	
Phalacrocorax auritus double-crested cormorant	ABNFD01020	None	None	G5	S4	WL
Philanthus nasalis Antioch specid wasp	IIHYM20010	None	None	G1	S1	
Phrynosoma blainvillii coast horned lizard	ARACF12100	None	None	G3G4	S3S4	SSC
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	GNR	S3	SSC
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G5T1	S1	FP

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Rana boylii foothill yellow-legged frog	AAABH01050	None	Candidate Threatened	G3	S3	SSC
Rana draytonii California red-legged frog	AAABH01022	Threatened	None	G2G3	S2S3	SSC
Reithrodontomys raviventris salt-marsh harvest mouse	AMAFF02040	Endangered	Endangered	G1G2	S1S2	FP
Riparia riparia bank swallow	ABPAU08010	None	Threatened	G5	S2	
Sorex ornatus sinuosus Suisun shrew	AMABA01103	None	None	G5T1T2Q	S1S2	SSC
Sphecodogastra antiochensis Antioch Dunes halcitid bee	IIHYM78010	None	None	G1	S1	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Sternula antillarum browni California least tern	ABNNM08103	Endangered	Endangered	G4T2T3Q	S2	FP
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Thamnophis gigas giant gartersnake	ARADB36150	Threatened	Threatened	G2	S2	
Vulpes macrotis mutica San Joaquin kit fox	AMAJA03041	Endangered	Threatened	G4T2	S2	

Record Count: 71

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Antioch North, Antioch South, Clayton, Rio Vista, Jersey Island, Brentwood, Birds Landing, Denverton, and Honker Bay 7.5-minute USGS quadrangles

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Alkali Meadow	CTT45310CA	None	None	G3	S2.1	
Alkali Meadow						
Alkali Seep	CTT45320CA	None	None	G3	S2.1	
Alkali Seep						
Cismontane Alkali Marsh	CTT52310CA	None	None	G1	S1.1	
Cismontane Alkali Marsh						
Coastal and Valley Freshwater Marsh	CTT52410CA	None	None	G3	S2.1	
Coastal and Valley Freshwater Marsh						
Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Coastal Brackish Marsh						
Northern Claypan Vernal Pool	CTT44120CA	None	None	G1	S1.1	
Northern Claypan Vernal Pool						
Serpentine Bunchgrass	CTT42130CA	None	None	G2	S2.2	
Serpentine Bunchgrass						
Stabilized Interior Dunes	CTT23100CA	None	None	G1	S1.1	
Stabilized Interior Dunes						
Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Valley Needlegrass Grassland						

Record Count: 9

IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Contra Costa County, California

Local offices

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

San Francisco Bay-Delta Fish And Wildlife

(916) 930-5603
(916) 930-5654

650 Capitol Mall
Suite 8-300
Sacramento, CA 95814

http://kim_squires@fws.gov

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS

Salt Marsh Harvest Mouse Reithrodontomys raviventris — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/613

San Joaquin Kit Fox Vulpes macrotis mutica — Endangered
No critical habitat has been designated for this species.
https://ecos.fws.gov/ecp/species/2873

Birds

NAME	STATUS
California Clapper Rail Rallus longirostris obsoletus No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4240	Endangered
California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered

Reptiles

NAME	STATUS
Alameda Whipsnake (=striped Racer) Masticophis lateralis euryxanthus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5524	Threatened
Giant Garter Snake Thamnophis gigas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4482	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened
California Tiger Salamander Ambystoma californiense There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2076	Threatened

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus* There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS
Delta Green Ground Beetle *Elaphrus viridis* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2319	Threatened
Lange's Metalmark Butterfly *Apodemia mormo langei* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/4382	Endangered
San Bruno Elfin Butterfly *Callophrys mossii bayensis* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7850	Threatened

Crustaceans

NAME	STATUS
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Antioch Dunes Evening-primrose Oenothera deltoides ssp. howellii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5970	Endangered
Colusa Grass Neostapfia colusana There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5690	Threatened
Contra Costa Goldfields Lasthenia conjugens There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7058	Endangered
Contra Costa Wallflower Erysimum capitatum var. angustatum There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/7601	Endangered
Keck's Checker-mallow Sidalcea keckii There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/5704	Endangered
Soft Bird's-beak Cordylanthus mollis ssp. mollis There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/8541	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
Delta Smelt Hypomesus transpacificus https://ecos.fws.gov/ecp/species/321#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php
- Nationwide conservation measures for birds http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

MIGRATORY BIRD INFORMATION IS NOT AVAILABLE AT THIS TIME

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures and/or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the counties which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the E-bird Explore Data Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird entry on your migratory bird species list indicates a breeding season, it is probable that the bird breeds in your project's counties at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the BGEPA should such impacts occur.

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

This location overlaps the following wetlands:

ESTUARINE AND MARINE DEEPWATER

E1UBL

ESTUARINE AND MARINE WETLAND

E2USN

A full description for each wetland code can be found at the National Wetlands Inventory website: https://ecos.fws.gov/ipac/wetlands/decoder

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged

aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

CNPS California Native Plant Society

Plant List

Inventory of Rare and Endangered Plants

81 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3812128, 3812127, 3812126, 3812118, 3812117, 3812116, 3712188 3712187 and 3712186;

Modify Search Criteria | Export to Excel | Modify Columns | Modify Sort | Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Amsinckia grandiflora	large-flowered fiddleneck	Boraginaceae	annual herb	(Mar)Apr-May	1B.1	S1	G1
Androsace elongata ssp. acuta	California androsace	Primulaceae	annual herb	Mar-Jun	4.2	S3S4	G5? T3T4
Anomobryum julaceum	slender silver moss	Bryaceae	moss		4.2	S2	G5?
Arabis blepharophylla	coast rockcress	Brassicaceae	perennial herb	Feb-May	4.3	S4	G4
Arctostaphylos auriculata	Mt. Diablo manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.3	S2	G2
Arctostaphylos manzanita ssp. laevigata	Contra Costa manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar(Apr)	1B.2	S2	G5T2
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S2	G2T2
Atriplex cordulata var. cordulata	heartscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G3T2
Atriplex coronata var. coronata	crownscale	Chenopodiaceae	annual herb	Mar-Oct	4.2	S3	G4T3
Atriplex depressa	brittlescale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Blepharizonia plumosa	big tarplant	Asteraceae	annual herb	Jul-Oct	1B.1	S2	G2
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4
Calochortus pulchellus	Mt. Diablo fairy-lantern	Liliaceae	perennial bulbiferous herb	Apr-Jun	1B.2	S2	G2
Campanula exigua	chaparral harebell	Campanulaceae	annual herb	May-Jun	1B.2	S2	G2
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S2	G3T2
Centromadia parryi ssp. parryi	pappose tarplant	Asteraceae	annual herb	May-Nov	1B.2	S2	G3T2
Centromadia parryi ssp. rudis	Parry's rough tarplant	Asteraceae	annual herb	May-Oct	4.2	S3	G3T3
Chloropyron molle ssp. hispidum	hispid bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Sep	1B.1	S1	G2T1
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Nov	1B.2	S1	G2T1
	Bolander's water-	Apiaceae	perennial herb	Jul-Sep	2B.1	S2	G5T4

Cicuta maculata var. bolanderi	hemlock						
Cirsium hydrophilum var. hydrophilum	Suisun thistle	Asteraceae	perennial herb	Jun-Sep	1B.1	S1	G2T1
Collomia diversifolia	serpentine collomia	Polemoniaceae	annual herb	May-Jun	4.3	S4	G4
Convolvulus simulans	small-flowered morning-glory	Convolvulaceae	annual herb	Mar-Jul	4.2	S4	G4
Cordylanthus nidularius	Mt. Diablo bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Aug	1B.1	S1	G1
Cryptantha hooveri	Hoover's cryptantha	Boraginaceae	annual herb	Apr-May	1A	SH	GH
Delphinium californicum ssp. interius	Hospital Canyon larkspur	Ranunculaceae	perennial herb	Apr-Jun	1B.2	S3	G3T3
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU
Eriastrum ertterae	Lime Ridge eriastrum	Polemoniaceae	annual herb	Jun-Jul	1B.1	S1	G1
Eriogonum nudum var. psychicola	Antioch Dunes buckwheat	Polygonaceae	perennial herb	Jul-Oct	1B.1	S1	G5T1
Eriogonum truncatum	Mt. Diablo buckwheat	Polygonaceae	annual herb	Apr-Sep(Nov-Dec)	1B.1	S1	G1
Eriophyllum jepsonii	Jepson's woolly sunflower	Asteraceae	perennial herb	Apr-Jun	4.3	S3	G3
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Erysimum capitatum var. angustatum	Contra Costa wallflower	Brassicaceae	perennial herb	Mar-Jul	1B.1	S1	G5T1
Eschscholzia rhombipetala	diamond-petaled California poppy	Papaveraceae	annual herb	Mar-Apr	1B.1	S1	G1
Extriplex joaquinana	San Joaquin spearscale	Chenopodiaceae	annual herb	Apr-Oct	1B.2	S2	G2
Fritillaria agrestis	stinkbells	Liliaceae	perennial bulbiferous herb	Mar-Jun	4.2	S3	G3
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
Galium andrewsii ssp. gatense	phlox-leaf serpentine bedstraw	Rubiaceae	perennial herb	Apr-Jul	4.2	S3	G5T3
Grimmia torenii	Toren's grimmia	Grimmiaceae	moss		1B.3	S2	G2
Helianthella castanea	Diablo helianthella	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2
Hesperevax caulescens	hogwallow starfish	Asteraceae	annual herb	Mar-Jun	4.2	S3	G3
Hesperolinon breweri	Brewer's western flax	Linaceae	annual herb	May-Jul	1B.2	S2?	G2?
Hibiscus lasiocarpos var. occidentalis	woolly rose-mallow	Malvaceae	perennial rhizomatous herb (emergent)	Jun-Sep	1B.2	S3	G5T3
Isocoma arguta	Carquinez goldenbush	Asteraceae	perennial shrub	Aug-Dec	1B.1	S1	G1
Juglans hindsii	Northern California black walnut	Juglandaceae	perennial deciduous tree	Apr-May	1B.1	S1	G1
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1
Lathyrus jepsonii var. jepsonii	Delta tule pea	Fabaceae	perennial herb	May-Jul(Aug-	1B.2	S2	G5T2

				Sep)			
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	3	S3?	G3?
Lilaeopsis masonii	Mason's lilaeopsis	Apiaceae	perennial rhizomatous herb	Apr-Nov	1B.1	S2	G2
Limosella australis	Delta mudwort	Scrophulariaceae	perennial stoloniferous herb	May-Aug	2B.1	S2	G4G5
Madia radiata	showy golden madia	Asteraceae	annual herb	Mar-May	1B.1	S2	G2
Malacothamnus hallii	Hall's bush-mallow	Malvaceae	perennial evergreen shrub	(Apr)May-Sep(Oct)	1B.2	S2	G2
Microseris paludosa	marsh microseris	Asteraceae	perennial herb	Apr-Jun(Jul)	1B.2	S2	G2
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3
Myosurus minimus ssp. apus	little mousetail	Ranunculaceae	annual herb	Mar-Jun	3.1	S2	G5T2Q
Navarretia gowenii	Lime Ridge navarretia	Polemoniaceae	annual herb	May-Jun	1B.1	S1	G1
Navarretia heterandra	Tehama navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2
Navarretia nigelliformis ssp. nigelliformis	adobe navarretia	Polemoniaceae	annual herb	Apr-Jun	4.2	S3	G4T3
Navarretia nigelliformis ssp. radians	shining navarretia	Polemoniaceae	annual herb	(Mar)Apr-Jul	1B.2	S2	G4T2
Neostapfia colusana	Colusa grass	Poaceae	annual herb	May-Aug	1B.1	S1	G1
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	Onagraceae	perennial herb	Mar-Sep	1B.1	S1	G5T1
Phacelia phacelioides	Mt. Diablo phacelia	Hydrophyllaceae	annual herb	Apr-May	1B.2	S2	G2
Plagiobothrys hystriculus	bearded popcornflower	Boraginaceae	annual herb	Apr-May	1B.1	S2	G2
Potamogeton zosteriformis	eel-grass pondweed	Potamogetonaceae	annual herb (aquatic)	Jun-Jul	2B.2	S3	G5
Puccinellia simplex	California alkali grass	Poaceae	annual herb	Mar-May	1B.2	S2	G3
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4
Sagittaria sanfordii	Sanford's arrowhead	Alismataceae	perennial rhizomatous herb (emergent)	May-Oct(Nov)	1B.2	S3	G3
Sanicula saxatilis	rock sanicle	Apiaceae	perennial herb	Apr-May	1B.2	S2	G2
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
Senecio hydrophiloides	sweet marsh ragwort	Asteraceae	perennial herb	May-Aug	4.2	S3	G5
Sidalcea keckii	Keck's checkerbloom	Malvaceae	annual herb	Apr-May(Jun)	1B.1	S2	G2
Streptanthus albidus ssp. peramoenus	most beautiful jewelflower	Brassicaceae	annual herb	(Mar)Apr-Sep(Oct)	1B.2	S2	G2T2
Streptanthus hispidus	Mt. Diablo	Brassicaceae	annual herb	Mar-Jun	1B.3	S2	G2

	jewelflower						
Stuckenia filiformis ssp. alpina	slender-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	May-Jul	2B.2	S3	G5T5
Symphyotrichum lentum	Suisun Marsh aster	Asteraceae	perennial rhizomatous herb	(Apr)May-Nov	1B.2	S2	G2
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	1B.2	S2	G2
Triquetrella californica	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1
Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	May-Jun	2B.3	S3?	G4G5

Suggested Citation

California Native Plant Society, Rare Plant Program. 2019. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 20 April 2019].

Appendix C

GREENHOUSE GAS EMISSIONS ASSESSMENT
SAN FRANCISCO BAY AGGREGATES (SFBA)
PITTSBURG, CA

Submitted to:

Ms. Christie Robinson
Brezack & Associates Planning
3000 Citrus Circle, Suite 210
Walnut Creek, CA 94598

Investigative Science and Engineering, Inc.
Scientific, Environmental, and Forensic Consultants

P.O. Box 488
Ramona, CA 92065
(760) 787-0016
www.ise.us

ISE Project #19-004

May 14, 2019

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INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The San Francisco Bay Aggregates (SFBA) project site (APN 073-020-019-3) consists of approximately 2.5 gross acres, located at 895 East 3rd Street, Pittsburg, CA (Contra Costa County), as shown in Figure 1 on the following page. Regional access to the site is obtained from East 3rd Street via Harbor Street. The site is located within 2,500 feet, or greater, of nearby sensitive residential receptors as shown in Figure 2 on Page 3 of this report.

Surrounding land uses consist of the New York Slough, Suisun Bay, and part of the Sacramento-San Joaquin River Delta to the immediate north, and heavy industrial uses to the immediate east, west, and south (inclusive of East 3rd Street). These features can be seen in Figure 3 on Page 4 of this report.

Finally, the proposed project area resides as a fully disturbed land use, which was formerly the location of a 20-megawatt cogeneration power plant decommissioned in 2012. Two buildings remain in place as part of this previous use, with the remainder of the site remaining relatively open as a single building pad. Elevations across the property average approximately 13 feet above mean sea level (MSL).

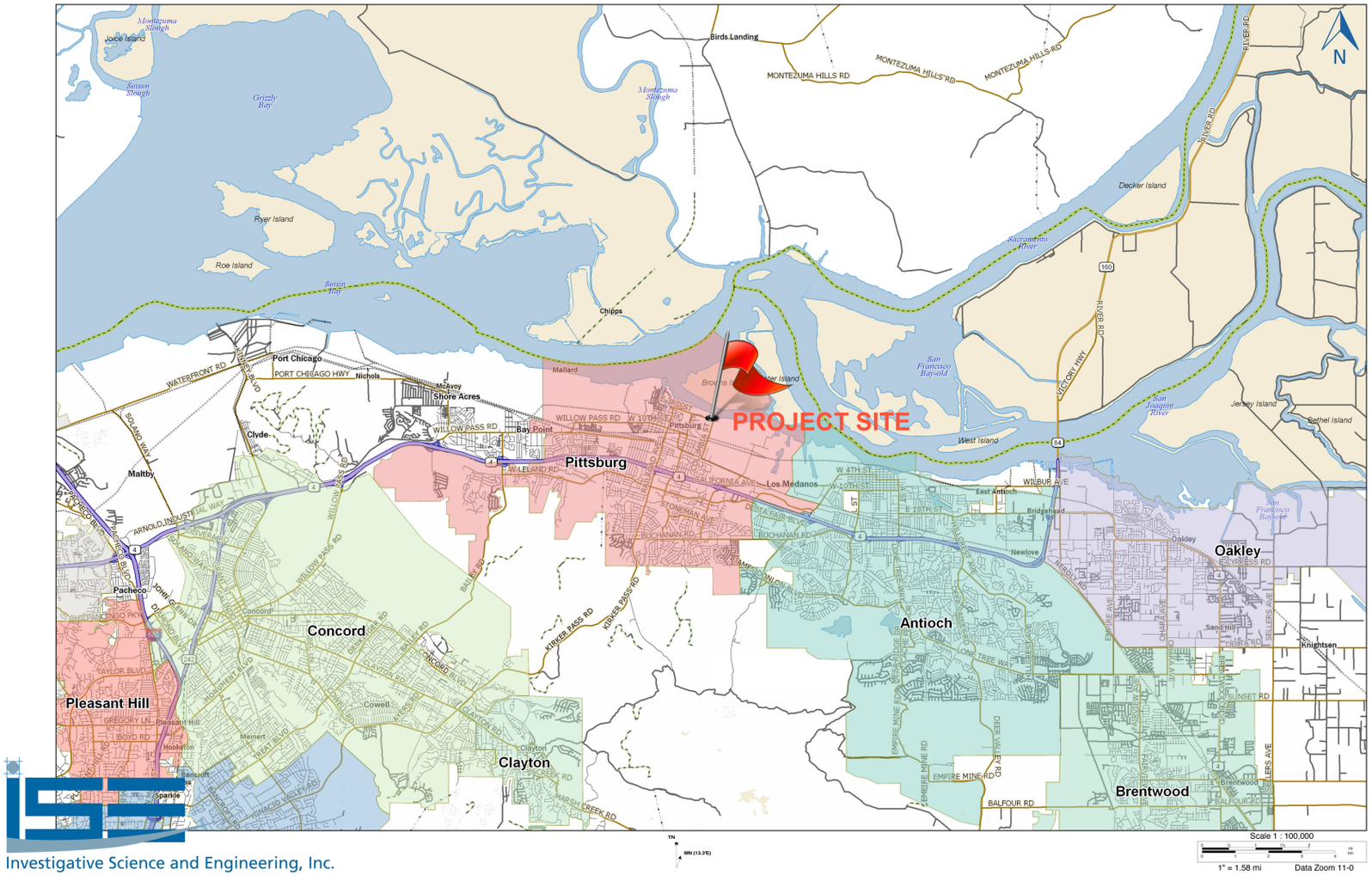
Project Description

The SFBA project would temporarily construct a pilot process plant to perform carbon capture and mineralization producing new "CO_2 sequestered" and "upcycled" rock products as shown in Figure 4 on Page 5 of this report. These upcycled rock products would be sold to Bay Area businesses, governments and consumers for use in a wide range of low carbon and high performance concrete applications.

Greenhouse Gases and Global Warming Potential

The Intergovernmental Panel on Climate Change (IPCC) defines greenhouse gases as those naturally occurring and anthropogenic chemical compounds within the atmosphere that absorb and reflect infrared radiation emitted by the Earth's surface.[1] A numerical metric known as the *'Global Warming Potential'* (or GWP) is a measure of how much a given mass of greenhouse gas is estimated to contribute to global warming relative to an 'equivalent' amount of carbon dioxide (CO_2). Equivalent CO_2 is denoted as CO_{2e} within this report.

[1] The basic mechanism can be summarized as follows: 1) solar radiation heats the planet primarily through ultraviolet transmission, 2) Earth warms and is offset by temperature levels in the oceans, 3) Earth emits black-body radiation in the lower infrared portion of the electromagnetic spectrum, 4) most of the infrared radiation escapes the planet, 5) a small portion of the energy is captured through molecular motion changes within the atmospheric greenhouse gases, and 6) this captured energy re-radiates back toward Earth producing a secondary heating effect. However, despite its name, this is not the same mechanism by which a greenhouse operates.



Investigative Science and Engineering, Inc.

FIGURE 1: Project Study Area Vicinity Map (ISE 5/19)

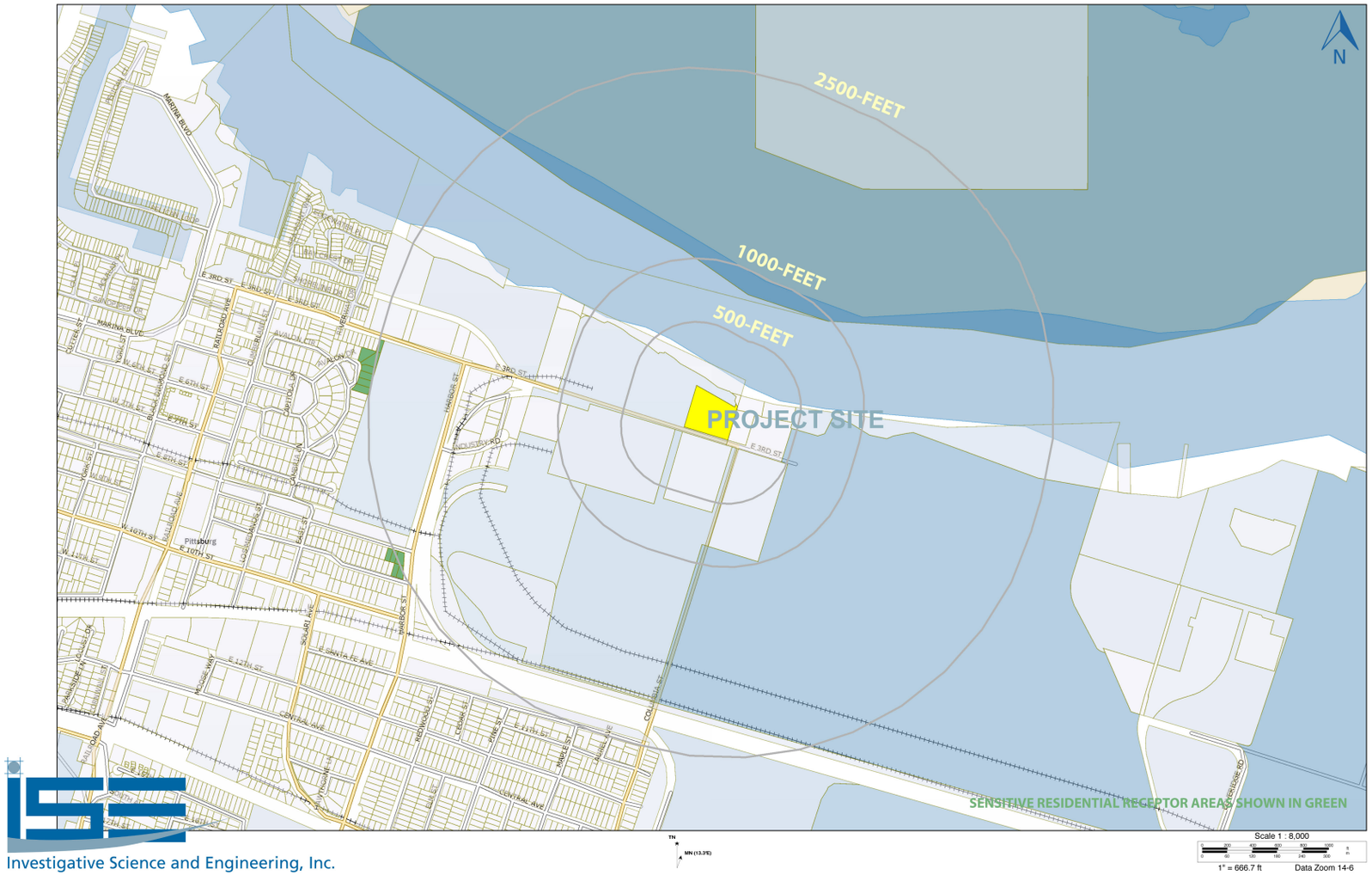


FIGURE 2: Project Study Area Parcel Map Showing Nearby Sensitive Receptors (ISE 5/19)

FIGURE 3: Aerial Image Showing Development Area and Surrounding Uses (ISE 5/19)

FIGURE 4: Proposed San Francisco Bay Aggregates Development Plan (AEPC Group LLC, 2/19)

Examples of the more prevalent greenhouse gases are:

- **Carbon dioxide (CO_2):** CO_2 is a naturally occurring gas and is part of the *carbon cycle,* whereby carbon is cycled between the atmosphere, ocean, terrestrial life, and mineral reserves. The predominant source of anthropogenic carbon dioxide emissions is from the combustion of fossil fuels and hydrocarbons. Without CO_2, all life on Earth would cease to exist. Carbon dioxide is the reference gas against which all other greenhouse gases are compared. It makes up approximately 3.6 percent of the global warming gases in the atmosphere today.
- **Water Vapor (H_2O):** Water is a chemical compound that is essential to all known forms of life. Water vapor is the gaseous form of water comprising roughly 0.001% of all water on the planet. Without H_2O, all life on Earth would cease to exist. Water vapor captures roughly 10 times as much infrared energy as CO_2.[2] Water vapor makes up approximately 95 percent of the global warming gases in the atmosphere today.
- **Methane (CH_4):** CH_4 is a greenhouse gas with both natural and anthropogenic sources and is believed to have been the primary atmospheric constituent of primordial Earth. Methane is naturally produced by the anaerobic decomposition of organic matter. Methane is also emitted during the production and distribution of natural gas and petroleum, and is released as a by-product of incomplete {low-temperature} fossil fuel combustion. Methane constitutes approximately 0.36 percent of the global warming gases in the atmosphere today.
- **Nitrous Oxide (N_2O):** Primarily, N_2O is naturally produced by bacterial action within the soil, and anthropogenically by high temperature combustion. The result is more-or-less the production of photochemical smog. Lesser sources, such as manufacturing, wastewater treatment, and biomass burning, also produce trace amounts of this substance. N_2O constitutes approximately 0.95 percent of the global warming gases in the atmosphere today.
- **Halocarbons (CFC's) / Perfluorocarbons (PFC's)** are carbon compounds that contain fluorine, chlorine, bromine or iodine. Anthropogenic sources are the primary generator of these substances. These gases constitute roughly 0.072 percent of the global warming gases in the atmosphere today.

A complete listing of known greenhouse gases (GHG's) and their associated GWP is shown in Table 1 on the following page.[3]

[2] The IPCC scientific panel states that about half of the projected global temperature increase from CO_2 is due to what is referred to as the *water vapor feedback effect*. Water vapor feedback is caused by the radiative efficiency of H_2O in vaporous form (i.e., its GWP). The UN IPCC report does not currently show this value.

[3] Source: *Climate Change 2001: The Scientific Basis*. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change, IPCC 2001.

TABLE 1: Known Greenhouse Gases and Global Warming Potential

Greenhouse Gas Name	Chemical Formula	GWP CO_{2e} Relative to CO_2	Greenhouse Gas Name	Chemical Formula	GWP CO_{2e} Relative to CO_2
Carbon Dioxide	CO_2	1	HFC-134 (1,1,2,2-Tetrafluoroethane)	HFC-134	1,100
Dibromomethane	CH_2Br_2	1	R-12B1 (Difluorochlorobromomethane)	Halon-1211	1,300
R-13I1 (Trifluoroiodomethane)	$FIC-13I_1$	1	R-134a (1,1,1,2-Tetrafluoroethane)	HFC-134a	1,300
R-E170 (Dimethyl ether)	CH_3OCH_3	1	R-22 (Chlorodifluoromethane)	HCFC-22	1,700
Methyl Bromide	CH_3Br	5	Carbon Tetrachloride	CCl_4	1,800
Dichloromethane	CH_2Cl_2	10	R-142b (1-Chloro-1,1-difluoroethane)	HCFC-142b	2,400
R-161 (Fluoroethane)	HFC-161	12	R-143a (1,1,1-Trifluoroethane)	HFC-143a	4,300
R-40 (Methyl Chloride)	CH_3Cl	16	R-11 (Trichlorofluoromethane)	CFC-11	4,600
Methane	CH_4	23	R-14 (Carbon Tetrafluoride)	CF_4	5,700
Chloroform	$CHCl_3$	30	R-113 (1,1,2-Trichloro-1,2,2-Trifluoroethane)	CFC-113	6,000
2,2,3,3,3-Pentafluoro-1-propanol	$CF_3CF_2CH_2OH$	40	R-E134 (1,1,1',1'-Tetrafluorodimethyl ether)	HFE-134	6,100
R-152 (1,1-Difluoroethane)	HFC-152	43	R-13B1 (Trifluorobromomethane)	$CBrF_3$	6,900
2,2,2-Trifluoro-ethanol	$(CF_3)CH_2OH$	57	R-115 (Chloropentafluoroethane)	CFC-115	7,200
R-41 (Methyl fluoride)	HFC-41	97	C_3F_8 (Perfluoropropane)	C_3F_8	8,600
R-123 (Dichlorotrifluoroethane)	HCFC-123	120	C_4F_{10} (Perfluoro-n-Butane)	C_4F_{10}	8,600
R-152a (1,1-Difluoroethane)	HFC-152a	120	C_5F_{12} (Perfluoropentane)	C_5F_{12}	8,900
1,1,1-Trichloroethane	CH_3CCl_3	140	C_6F_{14} (Perfluorohexane)	C_6F_{14}	9,000
1,1,1,3,3,3-Hexafluoro-2-Propanol	$(CF_3)_2CHOH$	190	R-114 (1,2-Dichlorotetrafluoroethane)	CFC-114	9,800
R-21 (Dichlorofluoromethane)	HCFC-21	210	R-C318 (Octafluorocyclobutane)	$C-C_4F_8$	10,000
Nitrous Oxide	N_2O	296	R-12 (Dichlorodifluoromethane)	CFC-12	10,600
HFC-143 (1,1,2-Trifluoroethane)	HFC-143	330	Nitrogen Trifluoride (Trifluoramine)	NF_3	10,800
Methyl perfluoroisopropyl ether	$(CF_3)_2CFOCH_3$	330	R-116 (Perfluoroethane; Hexafluoroethane)	C_2F_6	11,900
Bromodifluoromethane	$CHBrF_2$	470	R-23 (Trifluoromethane)	HFC-23	12,000
R-32 (Difluoromethane)	HFC-32	550	R-13 (Chlorotrifluoromethane)	CFC-13	14,000
R-124 (2-Chloro-1,1,1,2-Tetrafluoroethane)	HCFC-124	620	R-E125 (Pentafluorodimethyl ether)	HFE-125	14,900
R-141b (1,1-Dichloro-1-fluoroethane)	HCFC-141b	700	Sulfur Hexafluoride	SF_6	22,200
HFE-143a	HFE-143a	750			

THRESHOLDS OF SIGNIFICANCE

California Environmental Quality Act (CEQA) Thresholds

Section 15382, of the California Environmental Quality Act (CEQA) guidelines, defines a significant impact as,

> *"… a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."*

Senate Bill 97 (2007) set a January 1, 2010, deadline for new CEQA guidelines related to greenhouse gas emissions analysis and mitigation. The new guidelines do not require CEQA to establish fixed thresholds of significance; rather they serve to update the procedural language of Section 15064(a) leaving individual significance criteria to local agencies.

The California Global Warming Solutions Act (AB 32)

The California State Legislature passed the *California Global Warming Solutions Act of 2006* (AB 32). AB 32 requires the California Air Resources Board (CARB) to develop regulations and market mechanisms that will ultimately reduce California's greenhouse gas emissions by 25 percent, by 2020. Mandatory caps began in 2012 for significant sources, and will incrementally become stricter to meet the 2020 goals. For the purposes of analysis within this report (and to be consistent with AB 32), it will be sought to quantify the aggregate greenhouse gas emissions due to the proposed project action, as defined under CEQA.

BAAQMD Greenhouse Gas CEQA Thresholds

The Bay Area Air Quality Management District (BAAQMD) has established a set of guidelines for establishing thresholds of significance for greenhouse gasses (GHG's) consistent with CEQA and AB 32.[4] For projects other than stationary sources, a threshold of 1,100 MT of CO_{2e}/yr has been shown to produce a *de minimis* impact on basin-wide GHG emissions, and thus is in compliance with AB 32.[5]

For the proposed SFBA project, which constitutes a stationary source per the applicant's Authority to Construct Application, the District establishes a higher aggregate threshold of 10,000 MT of CO_{2e}/yr. This threshold will be utilized to analyze the proposed carbon capture and mineralization process of the pilot plant within this report.

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[4] Source: BAAQMD CEQA Air Quality Guidelines, Table 2-1, 5/17.

[5] Alternatively, a project of this type can also demonstrate compliance with a qualified GHG reduction strategy. This threshold would be applicable to most residential, commercial, and limited industrial uses.

ANALYSIS METHODOLOGY

Diesel Vehicle (Compression Ignition) CO_{2e} Contribution

Greenhouse gas emissions associated with diesel engine combustion from mass grading and site preparation construction equipment will be assumed to occur for engines running at the correct fuel-to-air ratios.[6] Of principal interest are the emission factors for CO_2 and NO_X. For a four-stroke diesel-cycle engine, the combustion byproducts are approximately 1.5-percent-by-volume O_2, 0.5-percent-by-volume CO, and 13.5-percent-by-volume CO_2.[7,8] Thus, the ratio of CO_2 (13.5 ppm) to CO (0.5 ppm) production in a properly mixed diesel stroke would be 13.5 divided by 0.5, or 27:1.

Gasoline Vehicle (Spark Ignition) CO_{2e} Contribution

CARB estimates on-road motor vehicle emissions by using a series of models called the *Motor Vehicle Emission Inventory* (MVEI) Models. The four computer models, which form the MVEI, are *CALIMFAC, WEIGHT, EMFAC*, and *BURDEN*.[9] For the current analysis, the *EMFAC 2017* of the MVEI was run using input conditions specific to the Contra Costa air basin to predict operational vehicle emissions from the project based upon a project completion/operational year 2020 scenario.[10]

Of principal interest are the emission factors for CO_2 and NO_X. A mix ratio consistent with the 2010 Caltrans ITS Transportation Project-Level Carbon Monoxide Protocol was used.[11]

Fixed Source Emissions CO_{2e} Contributions

Fixed emission sources under the analysis context within this report would consist predominantly of those emissions identified by the project applicant as being generated as part of the pilot plant operation. The SFBA project is expected to utilize one of two different sources of CO_2 for its carbon capture and mineralization process, defined as either Scenario 1 or Scenario 2.

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[6] The ratio whereby complete internal combustion of fuel occurs.

[7] It will be assumed that the project would generate trace, if not negligible, levels of methane (CH_4), ozone (O_3), fluorine (F_2), chlorine (Cl_2), bromine (Br_2) and/or constituent compounds. NO_x emissions are stoichiometrically composed of roughly 30-percent nitrous oxide (N_2O) by volume and 70-percent nitric oxide (NO), which is the free radical form that immediately combines with ozone (O_3) to form nitrogen dioxide (NO_2) more commonly known as *smog*.

[8] Source: Holtz, J.C., Elliott, M.A., *The Significance of Diesel-Exhaust-Gas Analysis, Transactions of the ASME, Vol. 63, February 1941*.

[9] CALIMFAC produces base emission rates for each model year when a vehicle is new, and as it accumulates mileage and the emission controls deteriorate. WEIGHT calculates the relative weighting each model year should be given in the total inventory, and each model year's accumulated mileage. EMFAC uses these pieces of information, along with the correction factors and other data, to produce fleet composite emission factors. BURDEN combines the emission factors with county-specific activity data to produce the emission inventories.

[10] This is the most current CARB emissions model approved for use within the State of California.

[11] This consisted of the following air standard Otto-Cycle engine vehicle distribution percentages: Light Duty Auto (LDA) = 69.0%, Light Duty Truck (LDT1) = 19.4%, Medium Duty Truck (LHD1) = 6.4%, Heavy Duty Truck Gasoline (MH GAS) = 1.2%, Heavy Duty Truck Diesel (MH DSL) = 3.6%, Motorcycle (MCY) = 0.4%.

Scenario 1 assumes that the SFBA plant would utilize the excess flue gas from a single turbine and heat recovery steam generator (HRSG) at the Calpine LMEC site as the source of CO2 generation in the pilot process, while Scenario 2 assumes that the SFBA site would utilize a registered 6.3 MBtu/hr natural gas boiler onsite to provide the necessary CO_2 generation. Under these two conditions, Scenario 1 consumes outside CO_2 as part of the process, while Scenario 2 generates the necessary CO_2 onsite. This distinction is only important from the standpoint of determining aggregate greenhouse gas emissions from the site.

Finally, secondary operational greenhouse gas sources under the CEQA analysis context within this report would consist entirely of electrical consumption at the project site, solid waste trash generation from the site, and overall site water consumption.[12,13,14] An aggregate greenhouse gas tabulation of these sources, consistent with the CARB and current EPA protocols, will be provided.[15,16]

PROJECT GREENHOUSE GAS EMISSIONS

Diesel Engine (Compression Ignition) CO_{2e} Emissions

The proposed SFBA project site would be constructed and operated over the course of approximately 450 days without any deleterious air quality conformity impacts requiring mitigation, per BAAQMD guidelines.[17,18] The results are tabulated in Table 2 on the following page.

As previously discussed, since N_2O has a GWP of 296 with respect to CO_2, the result can be expressed as an *equivalent* CO_2 level (CO_{2e}) of 1,257,200.8 pounds, or 570.3 metric tons (MT). Thus, the final equivalent CO_2 GHG load due to the project would be the summation of this value, and the direct CO_2 production (including any water usage for dust control), also shown in Table 2, or 1,411,577.3 pounds (640.3 MT) CO_{2e}, during all activities.

---

[12] The electrical consumption required to produce one-million-gallons (MG) of potable water is approximately 13,021 KWh/MG. Using the CARB RPS standards, the baseline CO_{2e} generation rate is 641.86 pounds per Megawatt-hour (MWh). Simple unit conversion provides for a direct conversion value of 0.008357 lbs-CO_{2e}/gallon-H_2O. The conversion value for the mitigated RPS rate of 537.6 pounds per Megawatt-hour (MWh) would consequently be 0.006999 lbs-CO_{2e}/gallon-H_2O.

[13] Source: Refining Estimates of Water-Related Energy Use in California, California Energy Commission (CEC) Public Interest Energy Research Program, 12/06.

[14] Landfill CO_{2e} generation due to trash equates to approximately 0.1450 kilograms (or 0.3196 pounds) per pound of trash per year, IPCC 2001.

[15] The analysis presented herein uses the same methodology identified in the CARB *URBEMIS* model, although providing a greater level of detail. The technical details are provided in the SCAQMD CEQA Handbook Tables A9-12 et. seq. as well as the EPA's AP-42 emission generation document previously referenced.

[16] Source: CalEEMod User Guide Appendix D, Table 9.1.

[17] The analysis of GHG emissions, unlike air quality conformity, which is a 'per day' threshold, is an aggregate quantity requiring summation over the total estimated number of work days.

[18] Source: Air Quality Conformity Assessment, San Francisco Bay Aggregates (SFBA) – Pittsburg, CA, ISE Project #19-004, 5/13/19.

TABLE 2: Diesel-Powered Construction / Material Handling Vehicle GHG Emissions

							Direct Stoichiometric Gas Emissions	
Equipment Type Model	**Selected EPA Tier Level**	**Daily CO in Pounds from AQIA**	**Daily NO_X in Pounds from AQIA**	**Duration (days)**	**Aggregate CO in Pounds (MT)**	**Aggregate NO_X in Pounds (MT)**	**CO_2= 27×CO in Pounds (MT)**	**N_2O = 0.3×NO_X in Pounds (MT)**
CAT 2PD5000 Forklift	3	1.7	3.1	450	748.8 (0.3)	1,396.5 (0.6)	20,218.2 (9.2)	418.9 (0.2)
JD 644E Loader	3	5.2	9.7	450	2,349.2 (1.1)	4,381.1 (2.0)	63,429.6 (28.8)	1,314.3 (0.6)
CAT CT610 Dump Truck	3	2.3	6.1	450	1,031.8 (0.5)	2,738.2 (1.2)	27,857.5 (12.6)	821.4 (0.4)
Peterbuilt 348 Transport Truck	3	3.2	8.5	450	1,444.5 (0.7)	3,833.4 (1.7)	39,000.5 (17.7)	1,150.0 (0.5)
Powered Haulage Emissions (MH DSL)		0.3	4.0	450	132.2 (0.1)	1,808.9 (0.8)	3,569.8 (1.6)	542.7 (0.2)
	Total (Σ):	**12.7**	**31.5**		**5,706.5 (2.6)**	**14,158.0 (6.4)**	**154,075.6 (69.9)**	**4,247.3 (1.9)**
						CO_{2e} from CO:	**154,075.6 (69.9)**	
						CO_{2e} from N_2O:	**1,257,200.8 (570.3)**	
						Direct CO_2 from Wet Suppression Water Usage: [19]	**300.9 (0.1)**	
						CO_{2e} Total Over Construction Period:	**1,411,577.3 (640.3)**	

Rounding margin of error ± 0.1 MT (220.5 pounds)

[19] Water usage based upon an assumed wet suppression level of 36,000 gallons over the course of construction.

Gasoline Engine (Spark Ignition) CO_{2e} Emissions

The proposed SFBA project site is expected to have a cumulative worst-case trip generation level of 25 ADT as previously analyzed within the project's Air Quality Impact Assessment (AQIA).[20,21] The average vehicle trip length would be 50 miles, with a median running speed of 45 MPH.[22] Given this, the aggregate project trip GHG emission levels are shown in Table 3 below.

TABLE 3: SFBA Daily Operational Vehicle GHG Levels

		Total Emissions in Pounds per Day (MT per Day)		
Vehicle Classification	**Trip ADT**	**Direct CO_2**	**Direct N_2O**	**CO_{2e}**
Light Duty Auto (LDA)	17	475.1 (0.2)	0.0 (0.0)	483.3 (0.2)
Light Duty Truck (LDT1)	5	156.0 (0.1)	0.0 (0.0)	161.6 (0.1)
Medium Duty Truck (LHD1)	2	128.6 (0.1)	0.0 (0.0)	132.7 (0.1)
Heavy Duty Truck Gasoline (MH GAS)	0	50.9 (0.0)	0.0 (0.0)	52.3 (0.0)
Heavy Duty Truck Diesel (MH DSL)	1	93.1 (0.0)	0.1 (0.0)	129.6 (0.1)
Motorcycle (MCY)	0	2.1 (0.0)	0.0 (0.0)	3.2 (0.0)
Total (Σ):	25	905.8 (0.4)	0.2 (0.0)	962.7 (0.4)
			CO_{2e} from CO:	**905.8 (0.4)**
			CO_{2e} from N_2O:	**57.0 (0.0)**
			CO_{2e} Operational Total Per Day:	**962.7 (0.4)**

Rounding margin of error ± 0.1 MT (220.5 pounds)
Values rounded to closest whole integer vehicle

Again, since N_2O has a GWP of 296 with respect to CO_2, the *equivalent* CO_{2e} level would be 57.0 pounds (less than 0.1 MT) for N_2O. The final equivalent daily CO_{2e} load due to vehicular traffic would be 962.7 pounds (0.4 MT). This equates to 159.4 MT per year CO_{2e} for this activity.

[20] Ibid. ISE, 5/13/19.

[21] Source: CARB *EMFAC 2017*, California Air Resources Board, 2019.

[22] The average assumed trip length is the average travel distance to or from the site and is based upon applicant's expectations for reasonable occupancy of the site. It is anticipated that some end trips will be shorter, and some longer, but for the purposes of analysis, the average value is given.

Predicted Operational CO_{2e} Emission Levels

Emissions Due to Operation of the Proposed Pilot Plant

As previously discussed, fixed CO_2 emission sources under the context of this pilot project would consist of two different scenarios, namely:

- **Scenario 1** assumes that the SFBA plant would utilize the excess flue gas from the Calpine LMEC site as the source of CO_2 generation in the pilot process. This scenario consumes outside waste CO_2 and thus would have a negative (-) generation rate from a site emissions standpoint.
- **Scenario 2** assumes that the SFBA site would operate a registered 6.3 MBtu/hr natural gas boiler onsite. This scenario produces waste CO_2 and thus would have a positive (-) generation rate from a site emissions standpoint.

Only one scenario will be ultimately selected as the CO_2 generation for the carbon capture and mineralization process of the pilot plant, and both scenarios anticipate an approximate 70% recovery rate of CO_2 through the mineralization process that would otherwise be released into the atmosphere. The complete operational emissions summary, as estimated by the project applicant, is shown in Table 4 below.

TABLE 4: SFBA Applicant Predicted Operational Emissions

Scenario Examined	Operational Phase	Generated CO_{2e} (MT)
Scenario 1: Flue Gas Extraction	Offsite Import of CO_2 to Site	-973.1
	Recovered CO_2 Level @ 70% Efficiency	**-681.2**
Scenario 2: Onsite Boiler Utilization	Onsite Generation of CO_2	+793.4
	Recovered CO_2 Level @ 70% Efficiency	+555.4
	Net CO_2 Level Remaining	**+238.0**

Source: Atmospheric Dynamics, Inc. 4/19.

Thus, under Scenario 1, the project would remove 681.2 MT of CO_{2e} as a result of the carbon capture and mineralization process, while Scenario 2 would produce a small overall increase in CO_{2e} of 238.0 MT due to less than perfect system efficiency. These sources, in and of themselves, would not be classified as significant emission sources, and are not expected to generate a GHG impact.

Electrical Consumption GHG Emissions

The SFBA project site would require an estimated average yearly energy consumption of 775,000 KWh/year.[23] Utilizing an intensity factor consistent for a 20% *Renewable Portfolio Standard* (RPS), gives an annual equivalent CO_{2e} GHG load for the project site due to electrical usage of 225.6 MT/year.[24]

Solid Waste Generation GHG Emissions

The SFBA project site would have an onsite solid trash waste storage capacity of 10 cubic yards (cu-yd), with an average weight of 200 pounds per cubic-yard. Assuming two trash pickups per week, in accordance with proposed site requirements, the aggregate total solid waste removed from the site would be 208,000 lbs/year (or 104 short tons per year). According to the IPCC, landfill CO_{2e} generation due to trash is approximately 0.3196 pounds per pound of trash per year.[25] Thus, the direct landfill CO_{2e} contribution level would be 30.2 MT/yr.

Water Consumption / Wastewater Generation GHG Emissions

Finally, the SFBA project site would consume an estimated 110,000 gallons of potable water per year as part of the pilot plant process. The aggregate CO_{2e} emissions due to processing potable- and waste-water would equate to 919.3 pounds of CO_{2e} per year, or roughly 0.4 MT/yr.[26,27]

GHG Emissions Summary

The projected greenhouse gas emission budget for the proposed project would be the summation of the individual sources previously identified and compared against the two aforementioned pilot process scenarios, as shown in Tables 5a and -b starting on the following page.

As can be seen, both scenarios produce combined construction and operational levels far below the BAAQMD allowable threshold of 10,000 MT CO_{2e} per year. Thus, no construction or operational impacts are expected. No remedial mitigation is indicated.

[23] Based upon project applicant estimates of reasonable and foreseeable site utilization of 3.4 KWh/SF.

[24] The intensity conversion factor is approximately 641.86 lb-CO_2/MWh for the baseline case. This is derived by scaling the State of California 2009 CO_2 intensity factor, currently at 10.2% RPS, to account for a state required 20% RPS.

[25] Ibid., IPCC 2001.

[26] Ibid., CalEEMod Table 9.1.

[27] CalEEMod Table 9.4 for aerobic and anaerobic wastewater treatment types.

TABLE 5a: Summary of Significant Project-Related GHG Emissions – Scenario 1

Project Phase / Operation	Total CO_{2e} Emissions in MT/year
Construction / Material Handling / Haulage	+640.3
Operational Vehicular Emissions	+159.4
Electrical Consumption	+225.6
Solid Waste Generation	+30.2
Water Consumption / Wastewater Processing	+0.4
GHG Emissions Due to Project Development	**+1055.9**
Recovered CO_2 Level @ 70% Efficiency (Table 4)	-681.2
Final Project GHG Emissions Under Scenario 1	**+374.7**

Rounding margin of error ± 0.1 MT (220.5 pounds)

TABLE 5b: Summary of Significant Project-Related GHG Emissions – Scenario 2

Project Phase / Operation	Total CO_{2e} Emissions in MT/year
Construction / Material Handling / Haulage	+640.3
Operational Vehicular Emissions	+159.4
Electrical Consumption	+225.6
Solid Waste Generation	+30.2
Water Consumption / Wastewater Processing	+0.4
GHG Emissions Due to Project Development	**+1055.9**
Recovered CO_2 Level @ 70% Efficiency (Table 4)	+238.0
Final Project GHG Emissions Under Scenario 2	**+1293.9**

Rounding margin of error ± 0.1 MT (220.5 pounds)

CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE). The members of its professional staff contributing to the report are listed below:

Rick Tavares *(rtavares@ise.us)*	Ph.D. Civil Engineering M.S. Structural Engineering M.S. Mechanical Engineering B.S. Aerospace Engineering / Engineering Mechanics
Karen Tavares *(ktavares@ise.us)*	B.S. Electrical Engineering

ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810.

Approved as to Form and Content:

Rick Tavares, Ph.D.
Project Principal
Investigative Science and Engineering, Inc. (ISE)

APPENDICES AND SUPPLEMENTAL INFORMATION

EMFAC 2017 EMISSION FACTOR TABULATIONS – SCENARIO YEAR 2020

EMFAC2017 (v1.0.2) Emission Rates
Region Type: County
Region: CONTRA COSTA
Calendar Year: 2020
Season: Annual
Vehicle Classification: EMFAC2011 Categories
Units: miles/day for VMT, g/mile for RUNEX, PMBW and PMTW

Region	Calendar Year	Vehicle Category	Model Year	Speed	Fuel	VMT	CO_RUNEX	NOx_RUNEX	SOx_RUNEX	PM10_RUNEX	PM2_5_RUNEX	ROG_RUNEX	CO2_RUNEX
CONTRA COSTA	**2020**	**LDA**	**Aggregated**	**45**	**GAS**	**387166.7409**	**0.729271714**	**0.048728631**	**0.002472466**	**0.001193598**	**0.001097492**	**0.009936701**	**249.8497649**
CONTRA COSTA	2020	LDA	Aggregated	45	DSL	4005.649273	0.176941811	0.113463235	0.001727677	0.008258802	0.00790153	0.013849134	182.7534492
CONTRA COSTA	**2020**	**LDT1**	**Aggregated**	**45**	**GAS**	**40081.42574**	**1.332219029**	**0.118128814**	**0.002886907**	**0.001696728**	**0.001560188**	**0.024571193**	**291.7301683**
CONTRA COSTA	2020	LDT1	Aggregated	45	DSL	13.90970071	1.074770296	1.307576425	0.003476592	0.126804796	0.121319277	0.17009827	367.7533936
CONTRA COSTA	2020	LDT2	Aggregated	45	GAS	134480.6268	0.938920497	0.089040629	0.003169294	0.001160226	0.001066818	0.014068092	320.2662294
CONTRA COSTA	2020	LDT2	Aggregated	45	DSL	888.072667	0.090059156	0.03911596	0.002365519	0.004494442	0.004300015	0.010570133	250.2241971
CONTRA COSTA	**2020**	**LHD1**	**Aggregated**	**45**	**GAS**	**5622.887648**	**0.849483672**	**0.265727655**	**0.00721481**	**0.000969462**	**0.0008918**	**0.029541048**	**729.0772315**
CONTRA COSTA	2020	LHD1	Aggregated	45	DSL	10736.87332	0.457730243	2.998245791	0.004227584	0.019225528	0.01839384	0.08304297	447.1931611
CONTRA COSTA	2020	LHD2	Aggregated	45	GAS	672.2672875	0.657697081	0.245348066	0.008222078	0.000864567	0.000794937	0.021717497	830.864516
CONTRA COSTA	2020	LHD2	Aggregated	45	DSL	3585.063232	0.3723974	2.241936658	0.004669972	0.017280011	0.016532485	0.067629136	493.9889781
CONTRA COSTA	**2020**	**MCY**	**Aggregated**	**45**	**GAS**	**3966.782721**	**17.8383195**	**1.129705635**	**0.001874301**	**0.00148569**	**0.001393997**	**1.877961948**	**189.4034375**
CONTRA COSTA	2020	MDV	Aggregated	45	GAS	92065.46955	1.237172965	0.134683768	0.00388131	0.00127936	0.001177419	0.024543884	392.2175087
CONTRA COSTA	2020	MDV	Aggregated	45	DSL	2096.076883	0.151897664	0.060349339	0.003118081	0.005182304	0.00495812	0.009637681	329.8300964
CONTRA COSTA	**2020**	**MH**	**Aggregated**	**45**	**GAS**	**2039.709002**	**1.73062632**	**0.469685052**	**0.015243032**	**0.001115392**	**0.001026102**	**0.052546548**	**1540.352045**
CONTRA COSTA	**2020**	**MH**	**Aggregated**	**45**	**DSL**	**617.1566844**	**0.302883551**	**4.143920222**	**0.008870647**	**0.099414111**	**0.095113501**	**0.059295712**	**938.335768**
CONTRA COSTA	2020	Motor Coach	Aggregated	45	DSL	74.99117547	0.682509598	4.066897321	0.012858516	0.08095037	0.077448492	0.160853615	1361.048958
CONTRA COSTA	2020	OBUS	Aggregated	45	GAS	1699.201298	2.373881116	0.718238713	0.015294526	0.000591102	0.000543978	0.071313382	1545.55568
CONTRA COSTA	2020	SBUS	Aggregated	45	GAS	117.8156669	0.923218413	0.300476334	0.006945744	0.000711367	0.000654076	0.028044569	701.8873411
CONTRA COSTA	2020	SBUS	Aggregated	45	DSL	991.6605538	0.113795893	3.37678951	0.008567343	0.017370183	0.016618757	0.030186134	906.8366537
CONTRA COSTA	2020	T6 Ag	Aggregated	45	DSL	2.322875592	1.930687785	8.288701752	0.009850121	0.375279577	0.359045149	0.538031118	1042.616225
CONTRA COSTA	2020	T6 CAIRP heavy	Aggregated	45	DSL	79.08670437	0.127960762	1.081700365	0.007458995	0.021128822	0.020214798	0.028849286	789.5201954
CONTRA COSTA	2020	T6 CAIRP small	Aggregated	45	DSL	10.66773977	0.217898126	1.400846128	0.007933221	0.038608924	0.036938719	0.053281524	839.7160129
CONTRA COSTA	2020	T6 instate construction heavy	Aggregated	45	DSL	454.1095746	0.505590672	3.675700494	0.008777777	0.087038328	0.083273088	0.132015292	929.1107262
CONTRA COSTA	2020	T6 instate construction small	Aggregated	45	DSL	831.0002582	0.512527508	2.733137955	0.008513488	0.091696828	0.087730064	0.131421767	901.1361527
CONTRA COSTA	2020	T6 instate heavy	Aggregated	45	DSL	3333.934338	0.394055786	2.870833832	0.008191185	0.063892347	0.061128392	0.101219731	867.0210231
CONTRA COSTA	2020	T6 instate small	Aggregated	45	DSL	5373.48919	0.598573278	3.1516974	0.008689747	0.106731221	0.102114076	0.154690115	919.7928528
CONTRA COSTA	2020	T6 OOS heavy	Aggregated	45	DSL	43.57936995	0.129150303	1.053776417	0.007471557	0.021913567	0.020965596	0.029156923	790.8498308
CONTRA COSTA	2020	T6 OOS small	Aggregated	45	DSL	6.223591735	0.224343216	1.422657313	0.007938861	0.039808237	0.03808615	0.054933553	840.3130452
CONTRA COSTA	2020	T6 Public	Aggregated	45	DSL	1048.200081	0.113980524	4.396979005	0.008979156	0.022690136	0.021708571	0.032764451	950.426209
CONTRA COSTA	2020	T6 utility	Aggregated	45	DSL	129.0543018	0.055749257	1.25888523	0.008196963	0.007289303	0.006973971	0.012963269	867.6326362
CONTRA COSTA	2020	T6TS	Aggregated	45	GAS	4487.17646	2.523253295	0.688843381	0.014951967	0.000931377	0.000856367	0.076357885	1510.939056
CONTRA COSTA	2020	T7 Ag	Aggregated	45	DSL	1.476011826	5.017299605	17.94447106	0.015652487	0.709312622	0.678628072	1.112014835	1656.785404
CONTRA COSTA	2020	T7 CAIRP	Aggregated	45	DSL	1906.573659	0.249430247	2.291048646	0.011211498	0.030862515	0.029527416	0.051197907	1186.715359
CONTRA COSTA	2020	T7 CAIRP construction	Aggregated	45	DSL	338.3044876	0.243883759	2.240122618	0.011595928	0.030181115	0.028875493	0.04995149	1227.406487
CONTRA COSTA	2020	T7 NNOOS	Aggregated	45	DSL	2324.475754	0.268287829	1.963646563	0.010742864	0.03623146	0.034664103	0.054619615	1137.111306
CONTRA COSTA	2020	T7 NOOS	Aggregated	45	DSL	749.0489815	0.239250157	2.246956484	0.011211349	0.030270452	0.028960965	0.049326955	1186.699516
CONTRA COSTA	2020	T7 other port	Aggregated	45	DSL	1114.209252	0.300945066	3.947674733	0.013439629	0.030762789	0.029432005	0.09220972	1422.558657
CONTRA COSTA	2020	T7 POAK	Aggregated	45	DSL	5996.90892	0.342281618	4.515072074	0.013890499	0.034469744	0.032978598	0.109546689	1470.282388
CONTRA COSTA	2020	T7 Public	Aggregated	45	DSL	1133.668107	0.300979376	9.491142177	0.014423836	0.049569272	0.047424928	0.066348447	1526.735071
CONTRA COSTA	2020	T7 Single	Aggregated	45	DSL	1815.765135	0.689242273	4.866231512	0.013080359	0.099860996	0.095541053	0.16510481	1384.530592
CONTRA COSTA	2020	T7 single construction	Aggregated	45	DSL	839.2712094	0.605719535	4.880842764	0.012972797	0.08542345	0.08172807	0.143535151	1373.145413
CONTRA COSTA	2020	T7 SWCV	Aggregated	45	DSL	787.9561754	0.039375495	8.258597478	0.033953343	0.01109988	0.010619704	0.015423515	3593.895501
CONTRA COSTA	2020	T7 SWCV	Aggregated	45	NG	862.9402644	3.916552264	0.928451696	0	0.00388317	0.003715186	0.050082131	2780.007105
CONTRA COSTA	2020	T7 tractor	Aggregated	45	DSL	5553.959599	0.551369098	3.96031569	0.01211516	0.06750976	0.064589318	0.132112966	1282.366179
CONTRA COSTA	2020	T7 tractor construction	Aggregated	45	DSL	692.3248576	0.626908422	4.60262276	0.012937462	0.078729668	0.075323857	0.15431848	1369.405321
CONTRA COSTA	2020	T7 utility	Aggregated	45	DSL	86.76604441	0.15180775	3.764480376	0.013544557	0.015766178	0.01508414	0.037632863	1433.665117
CONTRA COSTA	2020	T7IS	Aggregated	45	GAS	38.00499836	37.67528889	3.730512146	0.018869598	0.001533054	0.001426884	0.564032961	1906.82693
CONTRA COSTA	2020	UBUS	Aggregated	45	GAS	50.44262803	0.108702918	0.084941911	0.008463109	0.000199253	0.000183205	0.004270481	855.2213599
CONTRA COSTA	2020	UBUS	Aggregated	45	DSL	311.7075753	0.076135541	1.454010379	0.011034364	0.00839524	0.008032066	0.000739994	1167.213421
CONTRA COSTA	2020	UBUS	Aggregated	45	NG	43.84507082	37.00020635	0.313112372	0	0.001019021	0.000974938	0.058473597	1462.977517
CONTRA COSTA	2020	All Other Buses	Aggregated	45	DSL	767.9265241	0.624895918	3.842823011	0.008522789	0.094790066	0.09068949	0.162041431	902.120651

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