DRAFT

Initial Study/Mitigated Negative Declaration

Federated Indians of Graton Rancheria Learning Center at Fairfield Osborn Preserve

AUGUST 2022

Prepared for:

SONOMA STATE UNIVERSITY
1801 East Cotati Avenue
Rohnert Park, California 94928-3609
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Acronyms and Abbreviations

Acronym/Abbreviation	Definition
AB	Assembly Bill
APE	Area of Potential Effects
BAAQMD	Bay Area Air Quality Management District
BMP	best management practice
BVAP	Bennett Valley Area Plan
CalEEMod	California Emissions Estimator Model
CARB	California Air Resources Board
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CPUC	California Public Utilities Commission
CSU	California State University
DTSC	Department of Toxic Substances Control
EIR	Environmental Impact Report
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FIGR	Federated Indians of Graton Rancheria
GHG	greenhouse gas
GWP	global warming potential
HFC	hydrofluorocarbon
kWh	kilowatt hours
LOS	level of service
MND	Mitigated Negative Declaration
N_2O	nitrous oxide
NAHC	Native American Heritage Commission
NF_3	nitrogen trifluoride
NO_x	oxides of nitrogen
OHWM	ordinary high water mark
PCA	Priority Conservative Areas
PDA	Priority Development Areas
PFC	perfluorocarbons
PM_{10}	particulate matter with an aerodynamic resistance diameter of 10 micrometers or less
$PM_{2.5}$	particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less
ROG	reactive organic gases
RPS	Renewable Portfolio Standard
SB	Senate Bill
SF_6	sulfur hexafluoride

Acronym/Abbreviation	Definition
SFBAAB	San Francisco Bay Area Air Basin
SR	State Route
SRA	State Responsibility Area
TAC	toxic air contaminants

1 Introduction

1.1 Project Overview

The proposed project consists of improvements to the existing visitor center and approximately 0.9 acres of surrounding grounds at the Fairfield Osborn Preserve (Preserve) in Sonoma County. The 450-acre nature preserve is managed and owned by the Sonoma State University (SSU) Center for Environmental Inquiry and serves as a teaching, gathering, and outdoor exploration space that is frequented by students, faculty, visitors, and community members including Native American tribes. The Federated Indians of Graton Rancheria will donate $2.85 million dollars to SSU to expand existing parking and improve the existing site and facilities. One of the objectives of the project is to develop a long-term partnership between Sonoma State University and FIGR. Objectives of this partnership include the following:

- Assessment of the nature, origins, NAGPRA-status, and future disposition of cultural materials previously on display at the Marjorie Osborne Education and Research Center, and currently stored at the Anthropological Studies Center at Sonoma State University.
- Establishing the principal trajectory for interpretation at the new FIGR Learning Center at Fairfield Osborn Preserve, by cooperatively designing an interpretive plan.
- Fostering a dialogue between SSU's Center for Environmental Inquiry (CEI) and FIGR on the future land management of the Fairfield Osborn Preserve in general; the objective being to reestablish Tribal perspectives and involvement on the entire property.

The proposed improvements include expansion of the existing surface parking, improved emergency vehicle access, accessible pedestrian circulation, construction of an outdoor circular seating area and tiered seating area, and minor interior and exterior renovations to the existing visitor center. The preliminary architectural concept calls for the use of stone and other natural materials that reflect the local area in areas proposed for improvement. The visitor center, currently known as the Marjorie Osborn Education & Research Center, will be renamed the "Federated Indians of Graton Rancheria Learning Center at Fairfield Osborn Preserve" upon project completion.

1.2 California Environmental Quality Act Compliance

Pursuant to Section 15063 of the California Environmental Quality Act (CEQA) Guidelines (Title 14, California Code of Regulations, Sections 15000 et seq.), an Initial Study is a preliminary environmental analysis that is used by the lead agency as a basis for determining whether an EIR, a Mitigated Negative Declaration, or a Negative Declaration is required for a project. SSU has prepared this Initial Study/Mitigated Negative Declaration (MND) pursuant to Sections 15070 – 15074 of the CEQA Guidelines.

1.3 Project Background

The Fairfield Osborn Preserve (Preserve) is a 450-acre nature preserve on Sonoma Mountain in Penngrove, Sonoma County. The Preserve is managed by the Sonoma State Center for Environmental Inquiry and serves as a teaching, gathering, and outdoor exploration space that is frequented by students, faculty, visitors, and community members including Native American tribes. The Preserve includes the Marjorie Osborn Education and Research Center and

outdoor support areas and a trail system that connects the 450-acre open space area. Copeland Creek, a tributary to the Russian River, traverses the Preserve along the area south of the parking lot, approximately 120 feet south of the proposed parking lot construction disturbance area and 75 feet north of the proposed visitor center disturbance area. The preserve supports grasslands and oak woodlands and provides habitat for several special-status species including the federally and state-listed threatened California red-legged frog (*Rana draytonii*). Archaeological surface surveys show evidence that the site was used as a seasonal hunting and gathering ground by the Pomo, Miwok, and Wappo peoples. The property was part of a Spanish Land Grant in the 1860s and was later used as a sheep and cattle ranch and a weekend retreat before it was donated to The Nature Conservancy. In 1997, the land was donated by The Nature Conservancy to the University; the original conservation easement established by The Nature Conservancy, which required that the land be set aside for educational, research and conservation purposes, remains in effect today.

The proposed project is sponsored by a gift from the local Federated Indians of Graton Rancheria (FIGR), working with the Sonoma State Office of Campus Planning, Design and Construction. The project objectives are to improve the Center for Environmental Inquiry program access to the Preserve, improve the educational experience of visitors, and continue collaboration with the Federated Indians of Graton Rancheria.

1.4 Public Review Process

This Initial Study and Proposed Mitigated Negative Declaration (IS/MND) is circulated for agency and public review for a 30-day review period. The review period is provided in the Notice of Intent circulated with this proposed IS/MND.

This document and supporting documents are available for review at the following location:

Facilities Management
Sonoma State University
1801 East Cotati Avenue
Rohnert Park, California 94928-3609

The Facilities Management office is located at the Corporation Yard on Laurel Avenue west of Petaluma Hill Road.

Online at: http://facilities.sonoma.edu/services/campus-planning-design-construction/projects

Comments on the proposed IS/ND must be received by 5:00 p.m. on the date shown in the NOI. Comments must be submitted via postal or electronic mail to the following address:

Attn: Anne Collins-Doehne
Capital Planning, Design, and Construction
Office of the Chancellor
401 Golden Shore
Long Beach, CA 90802-4210
acollins-doehne@calstate.edu

2 Summary of Findings

Environmental Factors Potentially Affected

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

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

Determination (To be completed by the Lead Agency)

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 ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier ENVIRONMENTAL IMPACT REPORT or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Anne Collins-Doehne

Signature

August 30, 2022

Date

Anne Collins-Doehne, Principal Environmental Planner
Capital Planning, Design & Construction, Office of the Chancellor

3 Initial Study Checklist

1. **Project title:**

   Federated Indians of Graton Rancheria Learning Center at Fairfield Osborn Preserve

2. **Lead agency name and address:**

   California State University, Sonoma

3. **Contact person and phone number:**

   Anne Collins-Doehne
   Principal Environmental Planner
   Capital Planning, Design & Construction, Office of the Chancellor
   562.951.4161
   acollins-doehne@calstate.edu

4. **Project location:**

   Lichau Road, Sonoma County
   Assessor's Parcel Numbers 136-201-043 and 136-210-024

5. **Project sponsor's name and address:**

   Sonoma State University Center for Environmental Inquiry

6. **General plan designation:**

   Resources and Rural Development, 40-acre minimum parcel size (Sonoma County)
   Bennett Valley[1]

7. **Zoning:**

   APN 136-201-043: RRD B6 40, BH SR (Sonoma County)
   Resources and Rural Development District, B6 Combining District (minimum 40 acres), Biotic Habitat Combining Zone, and Scenic Resources Combining District[1]

   APN 136-210-024: RRD B6 40, BH LG/MTN RC50/50 SR (Sonoma County)
   Resources and Rural Development District, B6 Combining District (minimum 40 acres), Biotic Habitat Combining Zone, Local Guidelines Combining District (Taylor/Sonoma/Mayacamas Mountains), Riparian Corridor Combining Zone (minimum 50 feet streamside conservation area and setback for agricultural cultivation), and Scenic Resources Combining District

[1] The General Plan and Zoning designations are listed per the Sonoma County General Plan and zoning code; however, the project is within state-owned land that is not subject to local land use ordinances and regulations.

8. Description of project:

Existing Conditions

The Fairfield Osborn Preserve is a 450-acre nature preserve on Sonoma Mountain in Penngrove, Sonoma County (see Figure 1). The Preserve is managed by the SSU Center for Environmental Inquiry and serves as a teaching, research, gathering, and outdoor exploration space that is frequented by students, faculty, visitors, and community members. The Preserve supports the Marjorie Osborn Education and Research Center and outdoor support areas and a trail system that allows access throughout the 450-acre open space area.

The project site is approximately 0.9 acres and is entirely located within the 450-acre Preserve (see Figure 2). The project site includes the existing 2,800-square foot (sf) visitor center with attached caretaker's residence, a dirt and gravel parking lot and driveway, a small solar array north of the parking lot, and a dirt pathway and wooden bridge that crosses a tributary to Copeland Creek on the path between the parking lot and visitor center. The visitor center includes two meeting rooms for education, research, conferences, and meetings (SSU 2020). The site is mostly flat, typically less than 15 percent slope. The area has undergone some degree of grading to create the flat terrain for the parking lot and visitor center. The area is an integral part of Sonoma Mountain and has been the site of human occupancy and settlement for upwards of 10,000 years. From the early 1970s through the 2000s, various portions (parcels) of the site were set aside incrementally as an ecological preserve which today is managed through the SSU Center for Environmental Inquiry.

Proposed Project

The components of the proposed project include an outdoor circular seating area and tiered seating area, interior and exterior improvements to the visitor center, construction of a pedestrian walkway connecting the existing parking lot and the visitor center, resurfacing of the pedestrian bridge that crosses the creek between the parking lot and visitor center, improvements to the existing parking lot to increase parking, and fire safety upgrades. The project site is approximately 0.9 acres (see Figure 3).

The proposed outdoor circular seating area would be built to the west of the existing visitor center, in the clearing between the building and surrounding oak trees (See Figure 3). The outdoor circular seating area will have permanent seating along its perimeter, constructed of concrete and wood. The center of the area would be surfaced with stone pavers and/or concrete. Small entrance aisles amid the seating would allow people to enter and exit. The outdoor circular seating area would be a physically distinct space in the project site.

The two-tiered seating is proposed to the east of the existing visitor center, in the gentle slope that lends itself naturally to the construction of a banked seating area facing the entrance to the visitor center courtyard. The seating would be constructed of concrete and wood. The courtyard would be paved, as it is part of the accessible path to the facility and used for outdoor activities.

Additional landscaping is not proposed as part of the outdoor seating areas. If existing native plants would be impacted by the construction of the seating areas, they would be replanted on site. Excavation of 18 to 24 inches below existing grade (and a soil quantity of approximately 6 cubic yards) would be required to construct the seating.

A cement concrete path would connect the east, north, and west sides of the visitor center and lead to the pedestrian bridge. The path will comply with accessibility requirements per the Americans with Disability Act (ADA) standards.

Proposed renovations to the visitor center are intended to orient it to the preserve and provide a welcoming visitor approach and entrance experience, and to accommodate increased interest in and demand for community and educational engagement opportunities. The preliminary concept design proposes renovations to the west building elevation that includes new glass doors located between existing windows to provide visual and physical connections between the indoor exhibit area and the proposed outdoor circular seating area such that the outdoor circular seating area would be visible from the exhibit area even when the exterior doors facing it are closed.

Minimal interior improvements will be made to the center. One of the two existing restrooms will be enlarged in order to comply with accessibility requirements while the second restroom will receive finish enhancements. The improvements also trigger fire-life-safety upgrades to the facility. Among those improvements is modifying a wall separating the caretaker and visitor center with an appropriate fire rating. The existing fire alarm panel needs to be upgraded, and fire alarm signal to communicate to the central monitoring. The site will require the addition of a self-supporting mini-tower east of the visitor center to send out the fire-alarm signal, since only phone and no Ethernet service is presently available on site. Additional improvements include a kitchenette remodel and upgraded interior finishes.

As part of the pedestrian improvements, the existing pedestrian bridge that traverses a tributary to Copeland Creek will be resurfaced with wood decking, and any structural repairs made as needed while protecting in place the existing bridge. After the existing bridge surface is removed, any minor repairs of the supporting structure will made. ADA paths on the site will be reconstructed with a concrete surface, as shown on Figure 3.

The existing 11 stall parking lot will be enlarged to provide additional parking spaces, to increase to a total of 19 stalls (1 ADA van stall, 1 clean vehicle stall, 1 electric vehicle stall without charging capabilities, and 16 standard stalls).[2] The parking surface will remain gravel with the exception of paving for the accessible space and the two clean vehicle stalls. The accessible stall and the shuttle bus drop-off area will be connected to the accessible concrete path. The parking stalls, and the turnaround described below, have been designed to avoid impacts to the trees that surround the parking lot. The total parking lot area, including the drive way will increase from approximately 9,410 SF to 15,620 SF, including the bus drop-off area and the emergency vehicle turnaround.

Due to the structural limitations of the soil in the existing parking lot, the proposed parking lot area will be excavated up to 2 feet in depth (typically 1 to 1.5 feet), and imported fill added. 1 foot of gravel will be placed on top of the compacted soil. This will result in the finished parking lot grade being one foot higher than the existing grade. Approximately 1070 cubic yards of soil from the existing parking area would be exported off-site.

[2] The clean vehicle stall provides preferred parking for vanpool, electric battery, and plug-in hybrid light-duty vehicles. The electrical vehicle stall will not include charging capabilities, but construction will include conduit placement for possible future wiring between the stall and the electrical panel (located within the existing shed on the south end of the parking lot).

To improve access for standard fire apparatus, a "hammerhead" turnaround would be constructed south of the parking lot to meet the requirements of the Rancho Adobe Fire Protection District. The turnaround accommodates a three-point turn by fire apparatus, with a clearance of 70 feet by 120 feet.[3] The paved driveway from Lichau Road, from the gate to the hammerhead turnaround, would be widened to 20 feet. A 13.5-foot vertical clearance must be maintained above the access road to accommodate the fire apparatus, which may require some minor tree trimming. The driveway will be conformed to meet the finish grade of the parking lot.

No trees are proposed for removal. Tree protection is included in the construction plans to protect the drip line of the trees during construction.

Signage will be added to the project site for wayfinding within the Preserve and updated to reflect the new name of the visitor center. These signage points may be constructed from boulders, weathering steel, natural or other weatherproof materials. Safety lighting would be added to visitor center entrances. Solar-powered landscape lights are proposed for the pedestrian pathways (to provide safe travel between the parking lot and the visitor center). Additional signage, including directional signs on Lichau Road to the visitor center, may be developed as part of the long-term interpretive plan (see MM TCR-4).

As part of the fire and life safety requirements (per the 2019 California Fire Code), a total of 12,020 gallons of water storage is necessary. Two 6,500-gallon water storage tanks would be installed east of the parking lot and a dry hydrant[4] would be installed. An underground gravity fed pipe connecting the water tanks and dry hydrant will be installed near the south end of the pedestrian bridge. The two water storage tanks would be polyethylene tanks, 10 feet in diameter and 12 feet, 8 inches in height.

A temporary crossing of the tributary to Copeland Creek would be installed during construction. The crossing consists of a fabric or mesh mudmat reinforced by timbers and is approximately 8 feet wide. At the conclusion of construction, the mudmat will be removed and the crossing will be revegetated. A three-year maintenance and monitoring period will be implemented for the revegetation area.

Project construction is anticipated to take approximately four months and would be timed to avoid wet weather to the extent feasible. Laydown areas for storage and staging of construction materials would be located within the existing parking lot and the visitor center courtyard, as shown on Figure 3.

9. Surrounding land uses and setting (Briefly describe the project's surroundings):

The project site is located within the 450-acre Fairfield Osborn Preserve. The Preserve is managed by the Sonoma State Center for Environmental Inquiry and serves as a teaching, research, gathering, and an outdoor exploration space that is frequented by K-12 students, university students, faculty, researchers, visitors, and community members. The Preserve is located at Sonoma Mountain, east of Penngrove, within Bennett Valley. Surrounding land uses include open space and low-density rural residential uses.

[3] A 96-foot radius turnaround in the parking lot was initially considered, but was rejected due to the impact it would have on mature trees in the project area. The Federated Indians of Graton Rancheria also identified the trees in the area as Tribal Cultural Resources and significant to the Tribe's cultural activities. Refer to Section 3.18, Tribal Cultural Resources, of the Initial Study Checklist, in this document for further discussion of this topic.

[4] A dry hydrant consists of a non-pressurized arrangement of piping with one end in the water and the other end extending to dry land.

10. Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):

The project is financially sponsored by the Federated Indians of Graton Rancheria, a federally recognized tribe of Sonoma and Marin Counties.

The project is subject to review by the Division of the State Architect for California Building Code compliance, including accessibility requirements, and the State Fire Marshal for facility fire and life safety compliance. In addition to the State Fire Marshal, the Rancho Adobe Fire Protection District (first responder) will review the project for adequate fire access.

Temporary work within the tributary would require the following permits:

- Streambed Alteration Agreement – California Department of Fish and Wildlife
- Clean Water Act 404 Permit – U.S. Army Corps of Engineers
- Clean Water Act 401 Certification – Regional Water Board
- Section 7 Consultation – U.S. Fish and Wildlife Service

11. Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?

Two California Native American tribes have requested notification of SSU projects per Public Resources Code Section 2108.31(b): the Federated Indians of Graton Rancheria (FIGR) and the Karuk Tribe. Certified letters offering the opportunity to enter into formal AB 52 consultation were mailed via the US Postal Service to the Karuk and FIGR Tribes on December 10, 2020. FIGR was also emailed a copy of the project notification on December 7, 2020.

FIGR responded via email on December 8, 2020 to request consultation. SSU and FIGR subsequently entered into consultation.

The Karuk Tribe did not respond to the written invitation for formal consultation. However, SSU's Anthropology Department contacted the Karuk Tribe in 2019 while preparing the cultural resources report for the project site. At that time the Karuk Tribe indicated they would defer to FIGR regarding tribal cultural resources.

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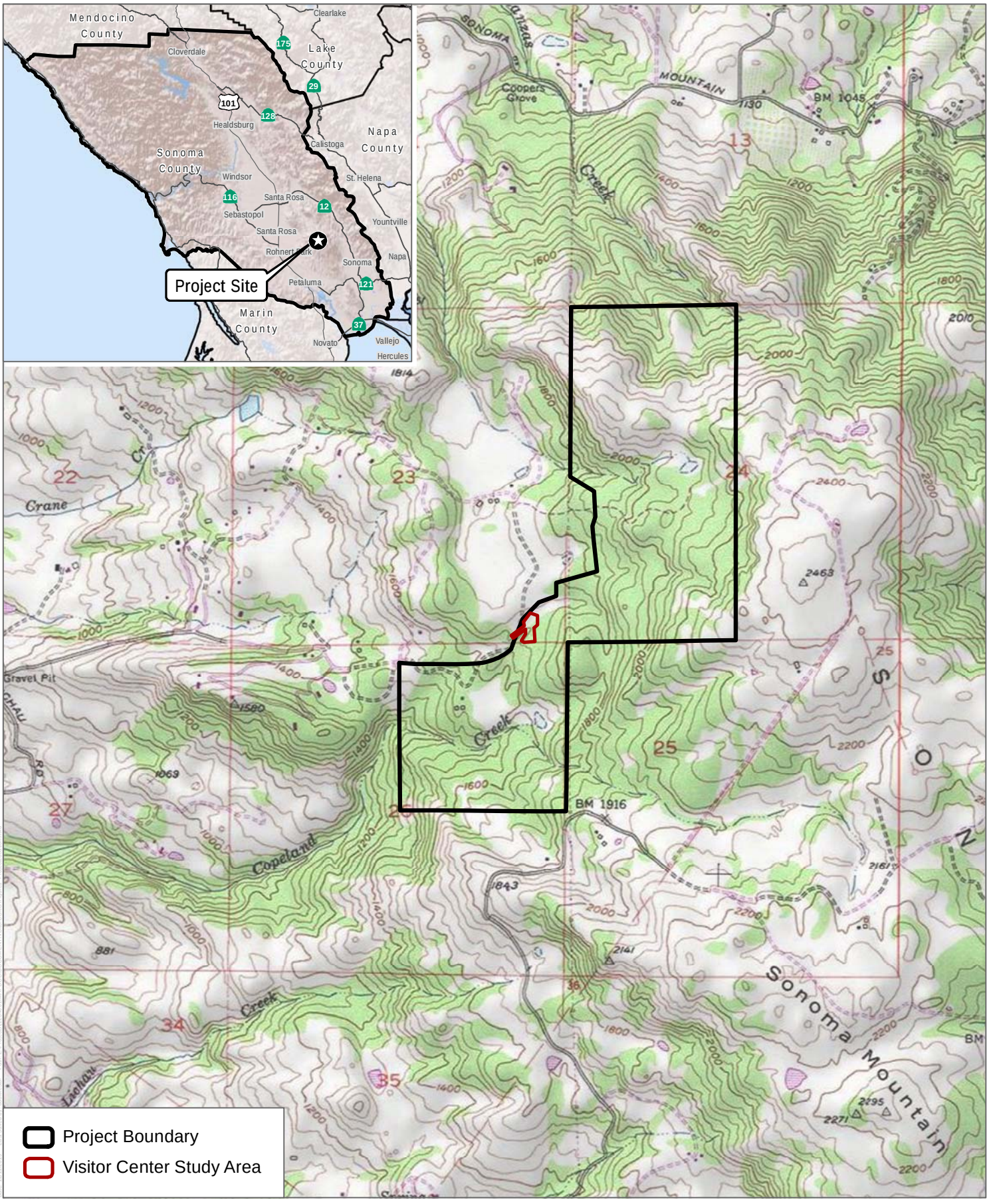

SOURCE: USGS 7.5 Minute Series Glen Ellen Quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Sonoma State Fairfield Osborne Preserve

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SOURCE: ESRI 2018

DUDEK

0 50 100 Feet

FIGURE 2

Project Site

Sonoma State Fairfield Osborne Preserve

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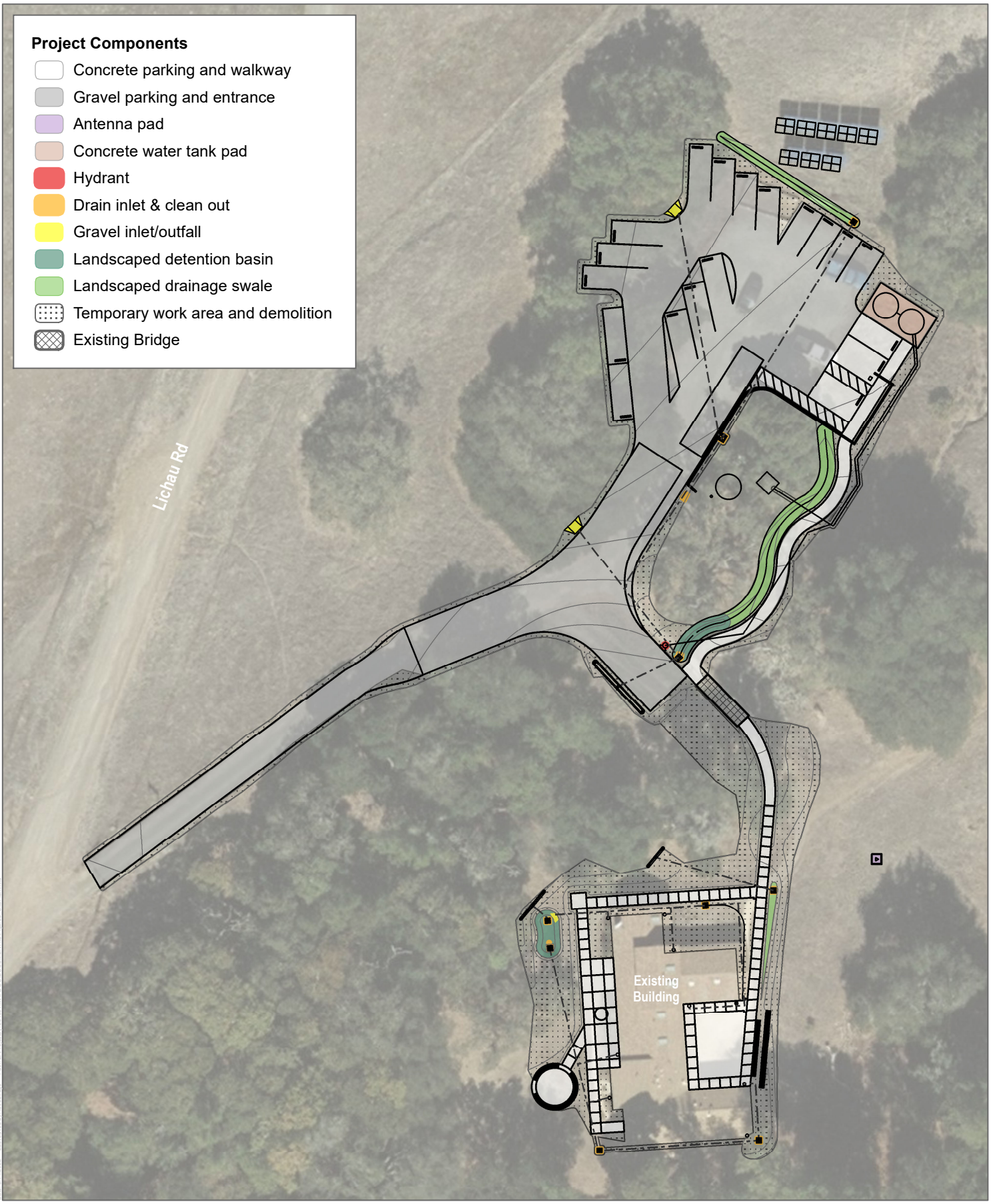

SOURCE: ESRI 2021, Marian 2021

DUDEK

0 25 50 Feet

FIGURE 3

Site Plan

Sonoma State Fairfield Osborne Preserve

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3.1 Aesthetics

		Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
I.	**AESTHETICS** – Except as provided in Public Resources Code Section 21099, would the project:				
a)	Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b)	Substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☐	☐	☒
c)	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?	☐	☐	☒	☐

a) Would the project have a substantial adverse effect on a scenic vista?

The proposed improvements include renovations to the visitor center, construction of an outdoor circular seating area and tiered seating, accessible pedestrian circulation, increased parking and required emergency access, wayfinding signage, and restroom and fire-life-safety upgrades. SSU is an entity of the CSU, which is a state agency, and is therefore not subject to local government planning and land use plans, policies, or regulations. SSU may consider, for informational purposes, aspects of local plans and policies for the communities surrounding the campus and its off-campus properties, when it is appropriate (see Section 3.11, Land Use, for additional discussion of local land use regulations). Accordingly, this IS/MND draws on the County's General Plan and municipal code, which provide information regarding scenic resources and viewer sensitivity.

The project site is designated by the Sonoma County code as a Scenic Landscape Unit within the Scenic Resources Combining District, which includes provisions related to maximum building height. The project site is also within the Bennett Valley Area Plan (BVAP), which establishes policies for development in the 15,500-acre Bennett Valley area southeast of the city of Santa Rosa in the County of Sonoma (Sonoma County 2011). The BVAP recommends avoiding skyline development and designing structures in harmony with natural surroundings. The project site is not within a local, state, or federally designated scenic vista,

and therefore the project would have no impact on a scenic vista. However, the site is considered to be visually significant. This is discussed in Item c, below.

b) Would the project substantially damage scenic resources including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

The project site is not visible from a state scenic highway. The closest state scenic highway is the segment of State Route (SR) 12, which extends from Santa Rosa to Agua Caliente. The closest point from the project site to SR-12 is approximately 6 miles to the east (Caltrans 2019). Additionally, no unusual natural resources are present on the project site, and the existing Marjorie Osborn Education and Research Center building has been determined not to be an eligible historical resource (refer to Section 3.5, Cultural Resources, and Appendix C). The project would not have a substantial adverse effect on scenic resources within a state scenic highway. The project would have no impact on visual resources within a state scenic highway.

c) In non-urbanized areas, would the project 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?

The existing visual character of the project site, located in a rural area, consists of the Marjorie Osborne Education and Research Center and outdoor support areas, as well as a trail system allowing for access throughout the 450-acre open space area. Potential viewers of the proposed project include SSU students, faculty, visitors and community members partaking in educational programs or guided tours.

The proposed improvements would include renovations to the visitor center and construction of additional outdoor support areas, such as an outdoor circular seating area and tiered seating, accessible pedestrian paths, enlarged parking areas, and additional wayfinding signage. Two water storage tanks would be constructed east of the parking lot. The two water storage tanks would be 6,500-gallon polyethylene tanks, 10 feet in diameter and 12 feet, 8 inches in height, but views of the tanks from the roadway would be limited due to intervening trees. The project would not include other new vertical elements that would impede views of the open space area or natural hillsides. The renovations to the visitor center would facilitate a stronger visual connection from the indoor exhibit area to the proposed outdoor circular seating area and open areas. New elements included as part of the proposed project would maintain the character of the Preserve and would not detract from existing views of Sonoma Mountain from public trails or other designated public vantage points.

The proposed project's impact on the visual character of quality of the project site and its surroundings would be less than significant.

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

The project site currently has minimal outdoor lighting, including building lighting and solar-powered fixtures on the pedestrian walkways. Surrounding land uses include open space and low-density rural residential. The proposed project would include additional lighting in the parking lot to meet minimum illumination standards under the California Building Code. Fixtures would be shielded downward lighting designed to

minimize spillover. The location, size, and tree canopy around the parking lot would minimize impacts to the surrounding area. No residences, other than the existing caretaker residence, would be affected by additional lighting. Impacts would be less than significant.

3.2 Agriculture and Forestry Resources

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

a) Would the project 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?

The project area is classified as Grazing Land by the Farmland Mapping and Monitoring Program (DOC 2016). In addition, the project area does not include soils that are conducive to Farmland of Statewide Importance (NRCS 2019). The project would not convert Important Farmland to non-agricultural use. Therefore, there would be no impact to farmlands.

b) Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

The project site is zoned Resources and Rural Development District. While this zoning allows for agricultural production, including timber, it also provides for compatible visitor-service uses. However, state property is exempt from local zoning and land use requirements and therefore would not conflict with existing zoning. The Preserve is not used for agricultural purposes and is not subject to a Williamson Act contract, and therefore the proposed project would not interfere with an agricultural use or Williamson Act contract. There would be no impact.

c) Would the project 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))?

The project site is not located on or adjacent to land zoned for forest land or timberland, including land zoned Timberland Production. The project site is designated Rural Resources District, Biotic Habitat and Scenic Resources Combining Zones in the BVAP. While the zoning allows for timber commercial production, the project site's current use is open space preserve and education. The proposed project would not change the designated zoning. Additionally, state property is exempt from local zoning and land use requirements and therefore would not conflict with existing zoning. No impact would occur.

d) Would the project result in the loss of forest land or conversion of forest land to non-forest use?

The project site is generally characterized by an open, mixed oak forest vegetation community (with associated grasslands) and disturbed land cover. The mixed oak forest is characterized by an overstory of mature coast live oak (*Quercus agrifolia*), California black oak (*Quercus kelloggii*), and valley oak (*Quercus lobata*) trees with some California bay (*Umbellularia californica*). Both the existing and proposed visitor-serving and educational use incorporates the existing mixed oak forest. The proposed project would result in a minimal increase in development footprint, such as from the establishment of two additional water tanks, but would not result in the removal of healthy trees. Therefore, the proposed project impacts to forest land would be less than significant.

e) Would the project 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?

The proposed project would not result in direct or indirect loss of forest resources. The project site is not located on or adjacent to farmland and would not impact the potential for nearby lands to support agricultural use. Therefore, the project would have no impact on forestry or agricultural resources.

3.3 Air Quality

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
III. 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:				
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 to odors) adversely affecting a substantial number of people?	☐	☐	☒	☐

Analysis

The proposed project is located in the San Francisco Bay Area Air Basin (SFBAAB), which is under the jurisdiction of the Bay Area Air Quality Management District (BAAQMD). In June 2010, the BAAQMD adopted thresholds of significance to assist lead agencies in the evaluation and mitigation of air quality impacts under CEQA. The BAAQMD CEQA Air Quality Guidelines were recently re-released in May 2017 and include the same thresholds as in the 2010 Guidelines for criteria air pollutants, toxic air contaminants (TACs), and greenhouse gases (GHGs) (BAAQMD 2017a). The Guidelines also address the December 2015 Supreme Court's opinion (*California Building Industry Association v. Bay Area Air Quality Management District* (2015) 62 Cal. 4th 369). Notably, the BAAQMD has initiated an update to the CEQA Air Quality Guidelines to reflect new or revised requirements in the State CEQA Guidelines, recent court decisions, improved analytical methodologies, and new mitigation strategies. The BAAQMD intends to review current thresholds of significance criteria and establish new significance criteria where needed. The current BAAQMD significance thresholds are summarized in Table 3.3-1.

In general, the BAAQMD significance thresholds for reactive organic gases (ROG), oxides of nitrogen (NO_x), particulate matter with an aerodynamic resistance diameter of 10 micrometers or less (PM_{10}), particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less ($PM_{2.5}$), and carbon monoxide (CO) address the first three air quality significance criteria. According to the BAAQMD, these thresholds are intended to maintain ambient air quality concentrations of these criteria air pollutants below state and federal standards and to prevent a cumulatively considerable contribution to regional nonattainment with ambient air quality standards. The TAC thresholds (cancer and noncancer risks) and local CO thresholds address the fourth significance criterion, and the BAAQMD odors threshold addresses the fifth significance criterion.

Table 3.3-1. Thresholds of Significance

Pollutant	Construction Thresholds	Operational Thresholds	
	Average Daily Emissions (lbs/day)	Average Daily Emissions (lbs/day)	Maximum Annual Emissions (tons/year)
ROG	54	54	10
NO_x	54	54	10
PM_{10}	82 (exhaust)	82	15
$PM_{2.5}$	54 (exhaust)	54	10
PM_{10}/$PM_{2.5}$ (fugitive dust)	Best Management Practices	None	
Local CO	None	9.0 ppm (8-hour average, 20.0 ppm (1-hour average)	
Risks and Hazards (Individual Project)	Compliance with Qualified Community Risk Reduction Plan or Increased cancer risk of >10.0 in a million Increased noncancer risk of >1.0 Hazard Index (Chronic or Acute) Ambient $PM_{2.5}$ increase >0.3 µg/m^3 annual average Zone of Influence: 1,000-foot radius from property line of source or receptor		
Risks and Hazards (Cumulative)	Compliance with Qualified Community Risk Reduction Plan or Cancer risk of >100 in a million (from all local sources) Noncancer risk of >10.0 Hazard Index (chronic, from all local sources) Ambient $PM_{2.5}$ >0.8 µg/m^3 annual average (from all local sources) Zone of Influence: 1,000-foot radius from property line of source or receptor		
Accidental Release of Acutely Hazardous Air Pollutants	None	Storage or use of acutely hazardous material located near receptors or new receptors located near stored or used acutely hazardous materials considered significant	
Odors	None	Five confirmed complaints to BAAQMD per year averaged over 3 years	

Source: BAAQMD 2017a.

Notes: lbs/day = pounds per day; tons/year = tons per year; ppm = parts per million; µg/m^3 = micrograms per cubic meter; ROG = reactive organic gases; NO_x = oxides of nitrogen; PM_{10} = particulate matter with an aerodynamic resistance diameter of 10 micrometers or less; $PM_{2.5}$ = fine particulate matter with an aerodynamic resistance diameter of 2.5 micrometers or less; CO = carbon monoxide

a) Would the project conflict with or obstruct implementation of the applicable air quality plan?

An area is designated as being "in attainment" when it is in compliance with the federal and/or state standards. These standards are set by the U.S. Environmental Protection Agency (EPA) or California Air Resources Board (CARB) for the maximum level of a given air pollutant that can exist in the outdoor air without unacceptable effects on human health or public welfare with a margin of safety. The SFBAAB is designated non-attainment for the federal 8-hour ozone (O_3) and 24-hour $PM_{2.5}$ standards. The area is in attainment or unclassified for all other federal standards. The area is designated non-attainment for state standards for 1-hour and 8-hour O_3, 24-hour PM_{10}, annual PM_{10}, and annual $PM_{2.5}$.

On April 19, 2017, the BAAQMD adopted the Spare the Air: Cool The Climate Final 2017 Clean Air Plan (BAAQMD 2017b). The 2017 Clean Air Plan provides a regional strategy to protect public health and the climate. The purpose of a consistency finding with regard to the 2017 Clean Air Plan is to determine if a project is consistent with the assumptions and objectives of the 2017 Clean Air Plan, and if it would interfere with the region's ability to comply with federal and state air quality standards. Since the proposed project would only result in minimal short-term construction associated with facility improvements, it would not result in regional growth or increased operational emissions. As such, the proposed project would not conflict or obstruct implementation of the 2017 Clean Air Plan, and this impact would be less than significant.

b) Would the project 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?

Past, present, and future development projects may contribute to the SFBAAB adverse air quality impacts on a cumulative basis. Per BAAQMD's CEQA Air Quality Guidelines, by its nature air pollution is largely a cumulative impact; no single project is sufficient in size to, by itself, result in nonattainment of ambient air quality standards. In developing thresholds of significance for air pollutants, BAAQMD considered the emission levels for which a project's individual emissions would be cumulatively considerable. If a project exceeds the identified significance thresholds, its emissions would be considered cumulatively considerable, resulting in a significant adverse air quality impact to the region's existing air quality conditions. Therefore, if the project's emissions are below the BAAQMD thresholds or screening criteria, then the project would not result in a cumulatively considerable net increase of any criteria air pollutant.

The California Emissions Estimator Model (CalEEMod) Version 2016.3.2 was used to estimate construction emissions from the proposed project. Regarding long-term operations, the project would not result in increased visitors or new sources of operational emissions. CalEEMod is a statewide computer model developed in cooperation with air districts throughout the state to quantify criteria air pollutant and GHG emissions associated with the construction and operational activities from a variety of land use projects, such as residential, commercial, and industrial facilities. CalEEMod input parameters, including the proposed project land use type and size and construction schedule, were based on information provided by SSU, or model defaults where project-specific information was not available.

Construction is anticipated to take approximately four months and would use standard construction methods. Based on project aerials, it was calculated that approximately 0.28-acres would be disturbed as the result of project construction, primarily associated with the parking lot expansion. Architectural coatings were assumed for the visitor center renovations. Sources of emissions would include off-road construction equipment exhaust, on-road vehicles exhaust and entrained road dust (i.e., material delivery trucks, haul trucks,

and worker vehicles), fugitive dust associated with construction activities, and paving and architectural coating activities. Detailed assumptions associated with project construction are included in Appendix A.

Average daily emissions were computed by dividing the total construction emissions by the number of active construction days, which were then compared to the BAAQMD construction thresholds of significance. Table 3.3-2 shows average daily construction emissions of O_3 precursors (ROG and NO_x), PM_{10} exhaust, and $PM_{2.5}$ exhaust during project construction.[5]

Table 3.3-2. Average Daily Unmitigated Construction Emissions

Year	ROG	NO_x	PM_{10} Exhaust	$PM_{2.5}$ Exhaust
	Pounds per Day			
2020 Construction	1.9	14.0	0.7	0.6
BAAQMD Construction Thresholds	*54*	*54*	*82*	*54*
Exceed Threshold?	**No**	**No**	**No**	**No**

Notes: See Appendix A. The values shown are average daily emissions based on total overall construction emissions in tons, converted to pounds, and divided by 88 active workdays.
ROG = reactive organic gases; NOx = oxides of nitrogen; PM_{10} = coarse particulate matter; $PM_{2.5}$ = fine particulate matter; BAAQMD = Bay Area Air Quality Management District

As shown in Table 3.3-2, construction of the proposed project would not exceed BAAQMD significance thresholds. Criteria air pollutant emissions during construction would be less than significant. Although the BAAQMD does not have a quantitative significance threshold for fugitive dust, the BAAQMD's CEQA Guidelines recommend that projects determine the significance for fugitive dust through application of best management practices (BMPs). BAAQMD recommends the following BMPs be incorporated into all projects:

1. All exposed surfaces (e.g., parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered two times per day.
2. All haul trucks transporting soil, sand, or other loose material off site shall be covered.
3. All visible mud or dirt track-out onto adjacent public roads shall be removed using wet power vacuum street sweepers at least once per day. The use of dry power sweeping is prohibited.
4. All vehicle speeds on unpaved roads shall be limited to 15 miles per hour (mph).
5. All roadways, driveways, and sidewalks to be paved shall be completed as soon as possible. Building pads shall be laid as soon as possible after grading unless seeding or soil binders are used.
6. Idling times shall be minimized either by shutting equipment off when not in use or reducing the maximum idling time to 5 minutes (as required by the California Airborne Toxics Control Measure Title 13, Section 2485 of California Code of Regulations [CCR]). Clear signage shall be provided for construction workers at all access points.

[5] Fuel combustion during construction and operations would also result in the generation of sulfur dioxide (SO_2) and CO. These values are included in Appendix A. However, since the SFBAAB is in attainment of these pollutants, the BAAQMD has not established a quantitative mass-significance threshold for comparison and are not included in the project-generated emissions tables in this document.

7. All construction equipment shall be maintained and properly tuned in accordance with manufacturer's specifications. All equipment shall be checked by a certified mechanic and determined to be running in proper condition prior to operation.
8. Post a publicly visible sign with the telephone number and person to contact at the Preserve regarding dust complaints. This person shall respond and take corrective action within 48 hours. The BAAQMD's phone number shall also be visible to ensure compliance with applicable regulations.

Based on the above considerations, the project would not 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. This impact would be less than significant.

c) Would the project expose sensitive receptors to substantial pollutant concentrations?

Some land uses are considered more sensitive to air pollution than others due to the types of population groups or activities involved. Children, pregnant women, older adults, and people with existing health problems are especially vulnerable to the effects of air pollution. Accordingly, land uses where sensitive-receptor population groups are likely to be located at hospitals, medical clinics, schools, playgrounds, childcare centers, residences, and retirement homes (BAAQMD 2017a). There are existing low-density residences around the project site, with the nearest at approximately 950 feet to the west of the project.

CO Hotspots

Traffic-congested roadways and intersections have the potential to generate localized high levels of CO. Localized areas where ambient concentrations exceed federal and/or state standards for CO are termed "CO hotspots." The transport of CO is extremely limited, as it disperses rapidly with distance from the source. Under certain extreme meteorological conditions, however, CO concentrations near a congested roadway or intersection may reach unhealthy levels, affecting sensitive receptors. Typically, high CO concentrations are associated with severely congested intersections operating at an unacceptable level of service (LOS) (LOS E or worse is unacceptable). Projects contributing to adverse traffic impacts may result in the formation of a CO hotspot. Additional analysis of CO hotspot impacts would be conducted if a project would result in a significant impact or contribute to an adverse traffic impact at a signalized intersection that would potentially subject sensitive receptors to CO hotspots.

Code of Federal Regulations title 40, section 93.123(c)(5), Procedures for Determining Localized CO, PM_{10}, and $PM_{2.5}$ Concentrations (Hot-Spot Analysis), states that "CO, PM_{10}, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities, which cause temporary increases in emissions. Each site that is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last 5 years or less at any individual site." Although project construction would involve on-road vehicle trips from trucks and workers during construction, construction activities would last approximately 88 days and would not require a project-level construction hotspot analysis. Furthermore, because the proposed project would not result in an increase in long-term operational vehicular trips, an operational CO hotspot evaluation also is not required.

Accordingly, the proposed project would not generate traffic that would contribute to potential adverse traffic impacts that may result in the formation of CO hotspots. In addition, because of continued improvement in vehicular emissions at a rate faster than the rate of vehicle growth and/or congestion, the potential for CO hotspots in the SFBAAB is steadily decreasing. Based on these considerations, the proposed project would result in a less than significant impact to air quality from potential CO hotspots.

Toxic Air Contaminants

TACs are defined as substances that may cause or contribute to an increase in deaths or in serious illness, or that may pose a present or potential hazard to human health. Health effects from carcinogenic air toxics are usually described in terms of cancer risk. BAAQMD recommends an incremental cancer risk threshold of 10 in 1 million. "Incremental cancer risk" is the net increased likelihood that a person continuously exposed to concentrations of TACs resulting from a project over a 9-, 30-, and 70-year exposure period will contract cancer based on the use of standard California Office of Environmental Health Hazard Assessment risk-assessment methodology (OEHHA 2015). In addition, some TACs have non-carcinogenic effects. BAAQMD recommends a Hazard Index of 1 or more for acute (short-term) and chronic (long-term) non-carcinogenic effects.[6] The TAC that would potentially be emitted during construction activities associated with development of the proposed project would be diesel particulate matter.

Diesel particulate matter emissions would be emitted from heavy equipment operations and heavy-duty trucks. Heavy-duty construction equipment is subject to a CARB Airborne Toxics Control Measure for diesel construction equipment to reduce diesel particulate emissions. According to the Office of Environmental Health Hazard Assessment, health risk assessments, which determine the exposure of sensitive receptors to toxic emissions, should be based on a 30-year exposure period for the maximally exposed individual resident; however, such assessments should be limited to the period and duration of activities associated with the proposed project. The duration of the proposed construction activities would only constitute a small percentage of the total 30-year exposure period. The active construction period for the proposed project would be approximately 88 days, after which construction-related TAC emissions would cease. Due to the substantial distance to sensitive receptors, the relatively short period of exposure, and minimal particulate emissions generated, TACs emitted during construction would not be expected to result in concentrations causing significant health risks. This impact would be less than significant.

Health Impacts of Criteria Air Pollutants

Construction of the proposed project would generate minimal criteria air pollutant emissions and would not exceed the BAAQMD mass-emission thresholds. The SFBAAB is designated as nonattainment for O_3 for the NAAQS and CAAQS. Thus, existing O_3 levels in the SFBAAB are at unhealthy levels during certain periods. The health effects associated with O_3 generally result in reduced lung function. Because the proposed project would not involve activities that would result in O_3 precursor emissions (i.e., VOCs or NO_X) that would exceed the BAAQMD thresholds, as shown in Table 3.3-2, the proposed project is not anticipated to substantially contribute to regional O_3 concentrations and their associated health impacts during construction.

[6] Non-cancer adverse health risks are measured against a hazard index, which is defined as the ratio of the predicted incremental exposure concentrations of the various non-carcinogens from the proposed project to published reference exposure levels that can cause adverse health effects.

In addition to O_3, NO_x emissions contribute to potential exceedances of the NAAQS and CAAQS for NO_2.[7] Exposure to NO_2 can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. As shown in Tables 3.3-2, construction of the proposed project would not exceed the BAAQMD threshold for NO_x. Thus, the proposed project is not expected to result in exceedances of the NO_2 standards or contribute to associated health effects.

CO tends to be a localized impact associated with congested intersections. In terms of adverse health effects, CO competes with oxygen, often replacing it in the blood, thereby reducing the blood's ability to transport oxygen to vital organs. The results of excess CO exposure can include dizziness, fatigue, and impairment of central nervous system functions. CO hotspots were discussed previously as a less than significant impact. Thus, the proposed project's CO emissions would not contribute to the health effects associated with this pollutant.

Particulate matter contains microscopic solids or liquid droplets that are so small that they can be transmitted into the lungs and cause serious health problems. Health effects associated with PM_{10} include premature death and hospitalization, primarily for worsening of respiratory disease. As shown in Table 3.3-2, the proposed project would not generate emissions of PM_{10} or $PM_{2.5}$ that would exceed the BAAQMD's thresholds. Construction of the project would also not exceed thresholds for PM_{10} or $PM_{2.5}$ and would not contribute to exceedances of the NAAQS and CAAQS for particulate matter or obstruct the SFBAAB from coming into attainment for these pollutants. Accordingly, the proposed project's PM_{10} and $PM_{2.5}$ emissions are not expected to cause an increase in related health effects for this pollutant.

In summary, the proposed project would not make a potentially significant contribution to regional concentrations of nonattainment pollutants and would not result in a significant contribution to the adverse health impacts associated with those pollutants. Therefore, impacts would be less than significant.

d) Would the project result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?

The occurrence and severity of potential odor impacts depends on numerous factors. The nature, frequency, and intensity of the source; the wind speeds and direction; and the sensitivity of receiving location each contribute to the intensity of the impact. Although offensive odors seldom cause physical harm, they can be annoying and cause distress among the public and generate citizen complaints.

Odors would be potentially generated from vehicles and equipment exhaust emissions during construction of the project. Potential odors produced during construction would be attributable to concentrations of unburned hydrocarbons from tailpipes of construction equipment, architectural coatings, and asphalt pavement application. Such odors would disperse rapidly from the project site and generally occur at magnitudes that would not affect substantial numbers of people. Additionally, the project would not result in sources of odors during long-term operations. Therefore, impacts associated with odors during project construction and operations would be less than significant.

[7] NO_2 is a constituent of NOx.

3.4 Biological Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IV. BIOLOGICAL RESOURCES – Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on 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?	☐	☐	☐	☒

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

A Biological Resources Constraints Evaluation was prepared in February 2020 by Dudek for the proposed project and is provided in Appendix B1 of this IS/MND. The purpose of this investigation was to identify and evaluate biological resource issues and potential constraints posed by such resources, including potential

permitting and regulatory requirements. The letter report, attached as Appendix B, includes the following: (1) a description of the methods used to conduct the evaluation; (2) a brief description of existing conditions on the project site and 300-foot buffer (the Biological Study Area); and (3) an analysis of special-status plant and wildlife species and other sensitive biological resources potentially present. The evaluation included a search of the California Natural Diversity Database (CNDDB; CDFW 2020), Inventory for Planning and Consultation (IPaC) database (USFWS 2020), and Inventory of Rare and Endangered Plants data (CNPS Inventory; CNPS 2020) for records of special-status species occurrences in the vicinity of the Biological Study Area. The evaluation also included a site visit that was conducted by a Dudek biologist on January 3, 2020 to assess current conditions and evaluate the Biological Study Area's potential to support sensitive natural communities, and special-status plant and wildlife species. Additionally, Dudek biologists conducted an aquatic resources jurisdictional delineation of the project site on December 29, 2020 to identify features that may be regulated as wetlands or waters of the U.S./State, included as Appendix B2 of this IS/MND.

The Biological Study Area is generally characterized by an open, mixed oak forest vegetation community (with associated grasslands) and disturbed land cover (Figure 4). The mixed oak forest is characterized by an overstory of mature coast live oak (*Quercus agrifolia*), California black oak (*Quercus kelloggii*), and valley oak (*Quercus lobata*) trees with some California bay (*Umbellularia californica*). The forest understory and open areas consisted of a mix of shrubs, vines, and herbaceous species, including blue wildrye (*Elymus glaucus*), California blackberry (*Rubus ursinus*), California brome (*Bromus carinatus*), California maidenhair (*Adiantum jordanii*), California swordfern (*Polystichum californicum*), Harding grass (*Phalaris aquatica*), orchardgrass (*Dactylis glomerata*), pennyroyal (*Mentha pulegium*), and other native species. The disturbed land cover type includes the access roads, parking lots, solar panels, and the visitor center buildings.

Common wildlife species detected within the Biological Study Area include the following: bushtit (*Psaltriparus minimus*), California scrub-jay (*Aphelocoma californica*), Hutton's vireo (*Vireo huttoni*), northern mockingbird (*Mimus polyglottos*), red-tailed hawk (*Buteo jamaicensis*), spotted towhee (*Pipilo maculatus*), Botta's pocket gopher (*Thomomys bottae*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*). No special-status wildlife species were detected during the site visit.

Results of the CNDDB, IPaC, and CNPS searches identified records for 20 special-status plant species and 30 special-status wildlife species within the region of the project site. The data and information provided by SSU on species detections from staff and the Preserve's visitors was used to help determine the potential for special-status species to occur within the Biological Study Area. A total of 36 species (14 plants and 23 wildlife species) were eliminated from further consideration based on a lack of suitable habitat or soil substrates, or because the project site is outside the known geographic or elevation range for the species. Six special-status plants and seven special-status wildlife species have at least a moderate potential to occur within the mixed oak forest vegetation community. Table 3.4-1 summarizes these special-status species.

None of the special-status plant species have been detected within the Biological Study Area during previous botanical inventories. However, potential direct temporary and permanent impacts resulting from grading and construction activities, as well as installation of the proposed improvements, could occur to special-status plant species, if present, and would be potentially significant. Indirect impacts to special-status plants that could occur during construction include a limited amount of dust in the immediate vicinity of areas potentially occupied by

special-status plants. A pre-construction survey for special-status plants within the mixed oak forest vegetation community is necessary to ensure avoidance of potentially occurring species.

Table 3.4-1. Potentially Occurring Special-Status Species

Scientific Name	Common Name	Status (Federal/State/CRPR)
Plants		
Amorpha californica var. *napensis*	Napa false indigo	None/None/1B.2
Balsamorhiza macrolepis	big-scale balsamroot	None/None/1B.2
Brodiaea leptandra	narrow-anthered brodiaea	None/None/1B.2
Hemizonia congesta ssp. *congesta*	congested-headed hayfield tarplant	None/None/1B.2
Navarretia leucocephala ssp. *bakeri*	Baker's navarretia	None/None/1B.1
Trifolium buckwestiorum	Santa Cruz clover	None/None/1B.1
Wildlife		
Amphibians		
Dicamptodon ensatus	California giant salamander	None/SSC
Rana boylii	foothill yellow-legged frog	None/SSC, PST
Rana draytonii	California red-legged frog	FT/SSC
Birds		
Aquila chrysaetos (nesting & wintering)	golden eagle	BCC/FP, WL
Elanus leucurus (nesting)	white-tailed kite	None/FP
Mammals		
Antrozous pallidus	pallid bat	None/SSC
Corynorhinus townsendii	Townsend's big-eared bat	None/SSC

Status:
Federal
FE – Federally Endangered
FT – Federally Threatened
BCC – USFWS Bird of Conservation Concern
State
FP – California Fully Protected Species
PST – Proposed State Threatened
SE – State Endangered
ST – State Threatened
SSC – Species of Special Concern
WL – California watch list species
CRPR (California Rare Plant Rank)
1B – Plants rare, threatened, or endangered in California and elsewhere;
(.1) Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
(.2) Moderately threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat)

MM BIO-1 requires a pre-construction survey for special-status plant species and prescribes actions to be taken if the species are detected. With implementation of MM BIO-1, impacts to special status species would be less than significant with mitigation. The California red-legged frog has been historically detected within the Biological Study Area. According to Preserve staff, a total of 13 California red-legged frogs have been found within the parking lot of the Preserve between 2011 and 2019. The remaining special-status wildlife species were not detected during field surveys conducted for this project or during previous wildlife inventories.

Potential direct temporary and permanent impacts resulting from grading and construction activities, as well as installation of the proposed improvements, could result in significant impacts to special-status wildlife species. Short-term, indirect impacts to special-status wildlife resulting from increased human presence and noise generated during construction activities could also result in significant impacts to special-status wildlife species.

- *California giant salamander and foothill yellow-legged frog*. These two special-status amphibians have at least a moderate potential to occur within the project site. A total of 0.12 acres of permanent impacts and 0.26 acres of temporary impacts (including buffer and staging areas) to potential habitat (mixed oak forest) for these species would be impacted during construction-related ground disturbance. Construction-related activities could have potentially significant impacts on these species, if present. A pre-construction survey for special-status wildlife within the mixed oak forest vegetation community is necessary to ensure avoidance of these potentially occurring species.
- *California red-legged frog*. This species is known to be present on the project site. Additionally, the project site occurs within USFWS-designated Critical Habitat for the species. However, suitable breeding habitat for the California red-legged frog (CRLF) is not present within the Biological Study Area. As a result, impacts from construction activities would be limited to potential upland and dispersal habitat for the species. Direct permanent and temporary impacts to the mixed oak forest vegetation community would result from ground disturbance during construction of the parking lot, access roads, visitor center upgrades, and associated drainage improvements. A total of 0.12 acres of permanent impacts and 0.26 acres of temporary impacts to CRLF upland habitat (mixed oak forest) could occur. Potential adverse impacts would be avoided and minimized with incorporation of standard best management practices during construction. Additional conservation measures to protect the species may include establishment of exclusionary fencing and monitoring by a qualified biologist during construction activities.
    - To protect potential special-status amphibian and reptile species, MM BIO-2 includes measures such as pre-construction training and surveys. If any special-status amphibian or reptile is discovered, construction shall be halted and the USFWS and the California Department of Fish and Wildlife (CDFW) shall be consulted. Any project activities that could potentially result in take of CRLF or loss of habitat would require consultation under Section 7 of the federal Endangered Species Act (or incidental take authorization via Section 10 of the federal Endangered Species Act if there is no federal nexus for the project). The project will require approval of a permit by the U.S. Army Corps of Engineers under Section 404 of the Clean Water Act. Therefore, the Corps will consult with the USFWS.
- *Pallid bat and Townsend's big-eared bat*. These two special-status mammals have at least a moderate potential to occur within the project site. A total of 0.12 acres of permanent impacts and 0.26 acres of temporary impacts to potential habitat (mixed oak forest) for these species would be impacted during construction-related ground disturbance. Construction-related activities could have potentially significant impacts on these species, if present. A pre-construction survey for special-status bat species is required prior to any ground-disturbing activities to ensure avoidance of potentially occurring species, per MM BIO-3. The preconstruction survey must include a determination as to whether active bat roosts are present on or within 50 feet of the project site. If active bat roosts are detected within the project site, then appropriate avoidance and minimization must be incorporated into the project design. Typically, avoiding the bat breeding season when

young may be present is accomplished by conducting work from September through March. Additionally, the timing of any construction activities should be limited to daylight hours to reduce disturbance to roosting (and foraging) bat species.

- *Golden eagle and white-tailed kite*. These two special-status birds have at least a moderate potential to occur within the project site. Complete avoidance of these fully protected species is required. Construction activities should therefore be conducted outside of the general nesting season for avian species (typically February through August). If construction occurs during the nesting season, all suitable habitat within a 300-foot buffer of the project site must be thoroughly surveyed by a qualified biologist for the presence of nesting birds before commencement of clearing, per MM BIO-3. If these species are detected, then appropriate site-specific measures must be developed by a qualified biologist in consultation with the CDFW to ensure avoidance.
- *Nesting birds*. The Biological Study Area supports potential nesting habitat for both raptors and songbirds due to the presence of trees, shrubs, and other ground cover. Nesting activity typically occurs from February through August. Disturbing or destroying active nests is a violation of the federal Migratory Bird Treaty Act. In addition, nests and eggs are protected under California Fish and Game Code Section 3503. Construction-related activities that occur within the general nesting season (February through August) could result in a substantial adverse effect to nesting birds. Construction activities that could result in direct impacts to nesting birds include vegetation removal during grading activities. Indirect impacts to nesting birds and roosting bats that could occur during construction include an increase in human activity and construction noise in the immediate vicinity of an active nest that could result in significant harassment and nest abandonment, causing loss of the nest. To avoid impacts to nesting birds, re-construction surveys and avoidance measures would be implemented per MM BIO-3.

Implementation of MM BIO-2 would reduce potentially significant direct and indirect impacts to special-status amphibian and reptile species, if identified, to a less-than-significant level. Implementation of MM BIO-3 would reduce potentially significant direct and indirect impacts to nesting birds and roosting bats, if identified, to less than significant with mitigation. Efforts shall be made to schedule construction activities outside the nesting season to avoid potential impacts to nesting birds. This would ensure that no active nests are disturbed and habitat removal could proceed rapidly. If construction activities occur during the nesting season, all suitable habitat must be thoroughly surveyed by a qualified biologist for the presence of nesting birds before commencement of clearing. If any active nests are detected, a buffer of at least 100 feet (300 feet for raptors) must be delineated, flagged, and avoided until the nesting cycle is complete as determined by a qualified biologist.

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

The mixed oak forest vegetation community is considered sensitive due to its high potential to support threatened and endangered plant and wildlife species. Mixed oak forests are not afforded legal protection unless they support special-status plant or wildlife species. Since this community has the potential to support special-status species (see discussion above), mitigation measures implemented for special-status species are also expected to be protective of this sensitive vegetation community. With implementation of MM BIO-1 through MM BIO-3, impacts would be less than significant with mitigation.

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

The *Aquatic Resources Jurisdictional Delineation for the Fairfield Osborn Preserve Visitor Center Improvement Project* conducted by Dudek was prepared to evaluate the presence and extent of aquatic resources that may be subjected to the jurisdiction of the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or the California Department of Fish and Wildlife (CDFW). The investigation included an analysis of aquatic resources within the vicinity of the project site, plus a 300-foot buffer (study area).

An unnamed tributary to Copeland Creek ('seasonal drainage') and two seasonal wetlands were investigated and mapped within the study area during the field assessment (Figure 5). Dudek delineated one seasonal drainage and two seasonal wetlands. Approximately 1,114 linear feet of the seasonal drainage bisects the study area. When inundated, this feature transports surface water within the study area from northeast to southwest before merging with Copeland Creek, approximately 0.35 mile southwest of the study area. The entire lateral extent of the banks meets the criteria to be considered "waters of the State" due to its physical, hydrological, and biological characteristics. As a result, the channel of this tributary appears to qualify as a jurisdictional aquatic resource regulated under the Clean Water Act,[8] Porter Cologne Water Quality Control Act,[9] and California Fish and Game Code.[10] The seasonal drainage is therefore expected to be under the joint jurisdiction of USACE, RWQB, and CDFW. The drainage's "ordinary high water mark" (OHWM) represents approximately 0.23 acre under USACE jurisdiction, and the lateral extent of the drainage's top of bank represents approximately 0.30 acre under RWQCB and CDFW jurisdiction. [11] The USACE jurisdiction overlaps and is a subset of the CDFW and RWQCB acreage (Dudek 2021).

Two seasonal wetlands comprising approximately 0.02 acre are present in the northwest portion of the study area, approximately 130 to 190 feet north of the seasonal drainage. Both features only appear to be inundated seasonally by precipitation, and are physically and hydrologically isolated from the seasonal drainage. The two seasonal wetlands do not meet the definition of a waters of the United States or adjacent wetlands under USACE jurisdiction. Similarly, these features do not appear to meet the definition of a river, stream, or lake under CDFW jurisdiction. CDFW regulates wetlands associated with stream and lake systems, such as riparian corridors or fringe wetlands. However, contrary to the USACE, the RWQCB asserts jurisdiction under the Clean Water Act over wetlands that are isolated from navigable waters of the United States. Therefore, seasonal wetlands 1 and 2 are anticipated to be regulated as wetland waters of the state by the RWQCB (Dudek 2021).

8 The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the United States and regulating quality standards for surface waters. 33 U.S.C. §1251 et seq. (1972) https://www.epa.gov/laws-regulations/summary-clean-water-act

9 The Porter Cologne Water Quality Control Act is the principal law governing water quality regulation in California. It establishes a comprehensive program to protect water quality and the beneficial uses of water. California Water Code Section 1300 et seq. https://www.waterboards.ca.gov/water_issues/programs/nps/encyclopedia/0a_laws_policy.html

10 Under Sections 1600–1616 of the California Fish and Game Code, CDFW regulates activities that would substantially alter the flow, bed, channel, or bank of streams and lakes. https://wildlife.ca.gov/Conservation/LSA

11 The ordinary high water mark is defined as that line on the shore established by the fluctuations of water, and is one of the means used to identify a tributary that may be considered waters of the U.S.

No permanent loss of state or federal wetlands would occur (Figure 6). Installation of a flexible fabric or mesh mudmat for access and erosion control across the seasonal drainage could temporarily impact approximately 123 square feet (0.003 acres) of USACE non-wetland waters of the U.S. and occur below the OHWM of the seasonal drainage. The mudmat would be installed prior to any construction activities and removed immediately following completion of the visitor center improvements. The two isolated seasonal wetlands would be completely avoided. All activities would occur within an existing, shared utility right-of-way and would be temporary. The temporary crossing of the seasonal drainage require regulatory permitting authorizations from the USACE, CDFW, and RWQCB.

The approximately 0.003 acre of temporarily impacted waters of the state will be replaced upon completion of construction and will immediately regain former functions and values of the pre-impact condition. All temporarily impacted areas will be graded and contoured to match pre-construction conditions and adjacent surface contours. Because restoration activities would be limited to 335 square feet of an unvegetated streambed and bank associated with the seasonal drainage and the area of temporary disturbance would be restored to pre-construction contours and conditions, a post-project report documenting the final impact and restoration of the construction area of temporary disturbance to pre-construction contours and conditions would be prepared. As a result, direct impacts of the Proposed Project on jurisdictional non-wetland waters would be less than significant.

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

The project site and surrounding environs are largely undeveloped and support a diverse range of vegetation communities and associated wildlife habitats. Although the project site is not identified as a regionally significant wildlife corridor, it provides local opportunities for wildlife movement. As mentioned above in Section 3.4 (c), the seasonal drainage was delineated and surveyed by Dudek, and no dominant riparian vegetation or corridor was associated within the study area (Dudek 2021). The nearest designated wildlife corridor is Sonoma Creek, which is located approximately 3.8 miles east of the project site. The Sonoma Creek corridor is identified as a landscape linkage with a medium priority for conservation by the California Wilderness Coalition. Mitigation measures implemented for special-status species are also expected to be protective of this migratory wildlife corridors. With implementation of MM BIO-1 through MM BIO-3, impacts would be less than significant with mitigation.

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

The proposed project would not require the removal of trees to accommodate the proposed parking lot expansion and hammerhead turnaround. The County's Tree Protection Ordinance (Chapter 26, Article 88, Sec. 26-88-010) sets preservation and protection standards for protected trees with a 9-inch or greater diameter at breast height. However, as previously discussed, the CSU is not subject to local ordinances. Accordingly, there would be no impact.

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

The project site is not located in an area subject to an established habitat conservation or natural communities conservation plan. There would be no impact.

Mitigation Measures

MM BIO-1 Prior to ground-disturbing activities, a focused pre-construction survey for special-status plant species shall be conducted by a qualified project biologist. The pre-construction survey shall be conducted during a period when the following target species are observable and identifiable (e.g., blooming period): Napa false indigo, big-scale balsamroot, narrow-anthered brodiaea, congested-headed hayfield tarplant, Baker's navarretia, and Santa Cruz clover. These species have overlapping blooming periods between May and June.

If special-status plants are detected during pre-construction survey, the location of the species will be mapped and the following measures will be implemented:

1. If complete avoidance is possible, special-status plants in the vicinity of the disturbance will be temporarily fenced or prominently flagged and a buffer established around the populations to prevent inadvertent encroachment by vehicles and equipment during the activity. Buffer size will depend on the construction activity and sensitivity of the plant species and may range in size from 10 to 50 feet.
2. If avoidance is not possible, seeds/bulbs will be collected and stored in appropriate storage conditions (e.g., cool and dry), and dispersed/transplanted to an area that would not be impacted following the construction activity and reapplication of salvaged topsoil. The top 6 inches of topsoil will be salvaged, stockpiled, and replaced as soon as practicable after project completion. The salvaged topsoil shall be redistributed at the same depth and contoured to blend with surrounding grades.

Additionally, while it is not expected that a federal or state-listed plant species will be observed during these surveys, the applicant shall consult with the applicable agency (i.e., CDFW and/or USFWS) and written concurrence for measures required for federal or state-listed plant species. As part of the consultation process, a plan to transplant federal or state-listed species will be developed and appropriate take permits obtained, if necessary. A transplantation plan for any observed state or federally listed plants will include the following at a minimum:

a) The area of occupied habitat to be preserved and removed.
b) Identification of on-site or off-site preservation, restoration, or enhancement locations.
c) Methods for preservation, restoration, enhancement, and/or translocation.
d) A replacement ratio and success standard of 1:1 for impacted individuals.
e) A monitoring program to ensure mitigation success.

f) Adaptive management and remedial measures in the event that performance stands are not achieved.

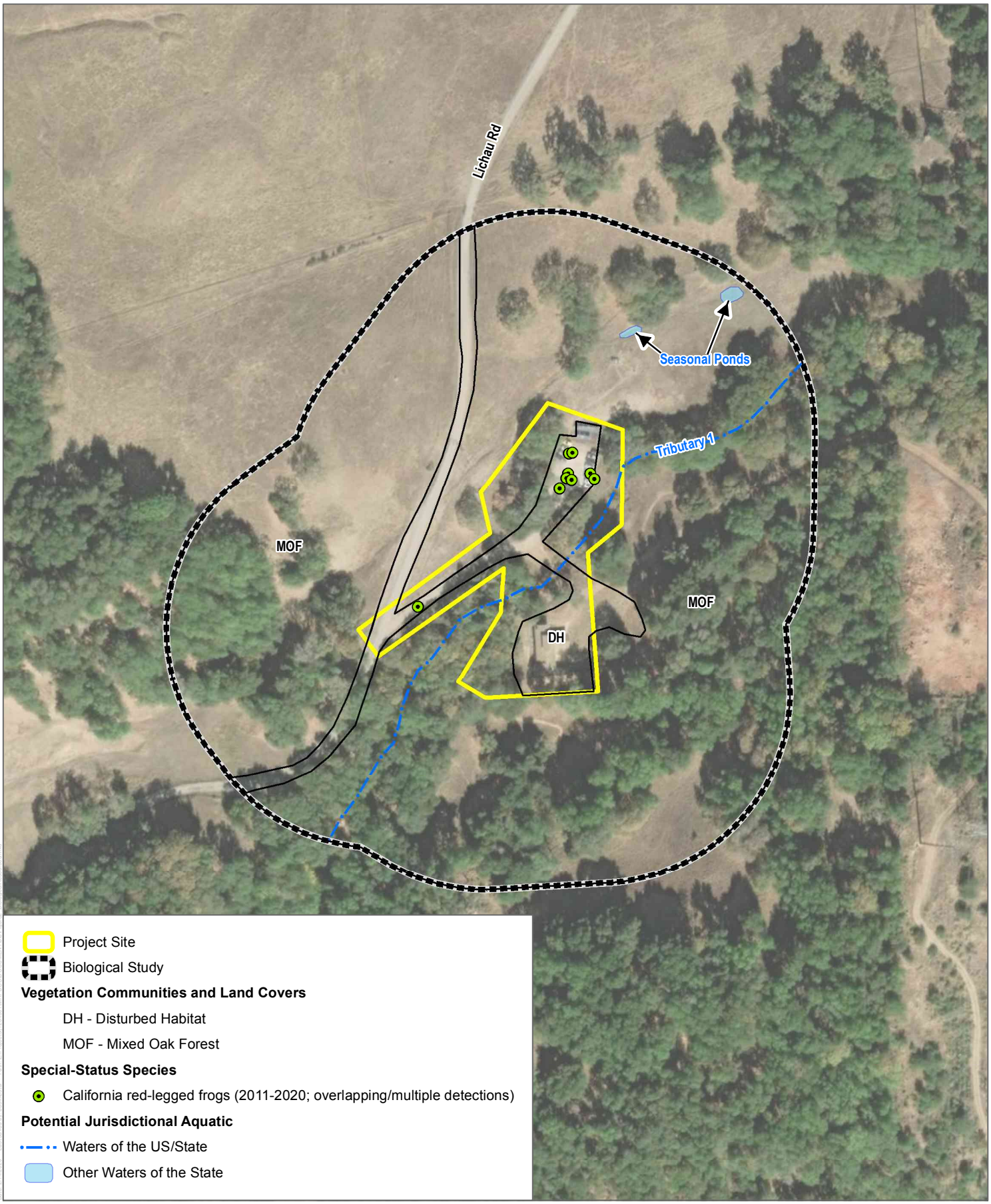
g) Financial assurances and a mechanism for conservation of any mitigation lands required in perpetuity.

MM BIO-2 The following measures shall be implemented to protect potential special-status amphibian and reptile species:

- Prior to initiation of construction, a qualified biologist shall conduct a training session for all construction personnel. The training shall include a physical description of California red-legged frog, California giant salamander, and foothill yellow-legged frog, their habitats, general measures that are being implemented for their protection, and what to do in the event one of these species is discovered in the construction area.
- Prior to initiation of ground-disturbing activities, a qualified biologist shall conduct a pre-construction survey for the presence of special-status amphibian or reptile species. Burrows that may provide potential aestivation habitat for California red-legged frog shall be scoped.
- Ground-disturbing activities shall only be conducted during dry conditions (primarily between July 1 and October 31), no more than 48 hours prior to or after a rain event.
- Construction and ground-disturbing activities shall be monitored by a qualified biologist and exclusionary fencing shall be established around construction areas.
- If at any time during preconstruction surveys or construction of the project a special-status amphibian or reptile is discovered within the construction area, construction shall be halted and the USFWS and CDFW shall be consulted. Take authorization from the USFWS (via Section 7 or Section 10 of the federal Endangered Species Act) is necessary if the proposed project would result in loss of individuals or impacts to habitat for these species.

MM BIO-3 Complete avoidance of construction activities within the general nesting season for avian and bat species is recommended, if feasible. However, if construction activities are scheduled to occur during the breeding season for birds or bats (February 1 through August 31), the following measures shall be implemented to avoid potential adverse effects to nesting raptors and other special-status bats or nesting birds determined to be potentially present in the project area:

- Preconstruction surveys by a biologist of all potential nesting or roosting habitats within 300 feet of the construction activities, where accessible, shall be conducted by a qualified biologist. Surveys shall occur no more than 14 days prior to the initiation of disturbance.
- If active nests or roosts are found during preconstruction surveys, a no-disturbance buffer shall be created around active nests during the breeding season or until it is determined that all young have fledged. If any active nests are detected, a buffer of at least 100 feet (300 feet for raptors) should be delineated, flagged, and avoided until the nesting cycle is complete as determined by a qualified biologist. The perimeter of the buffer zone shall be fenced or marked with staked flagging.
- If preconstruction surveys indicate that nests are inactive or potential habitat is unoccupied during the construction period, no further mitigation is required, and the survey results shall be kept as part of the project record.



SOURCE: ESRI 2018, Marian 2020

DUDEK

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FIGURE 4

Biological Resources

Sonoma State Fairfield Osborne Preserve

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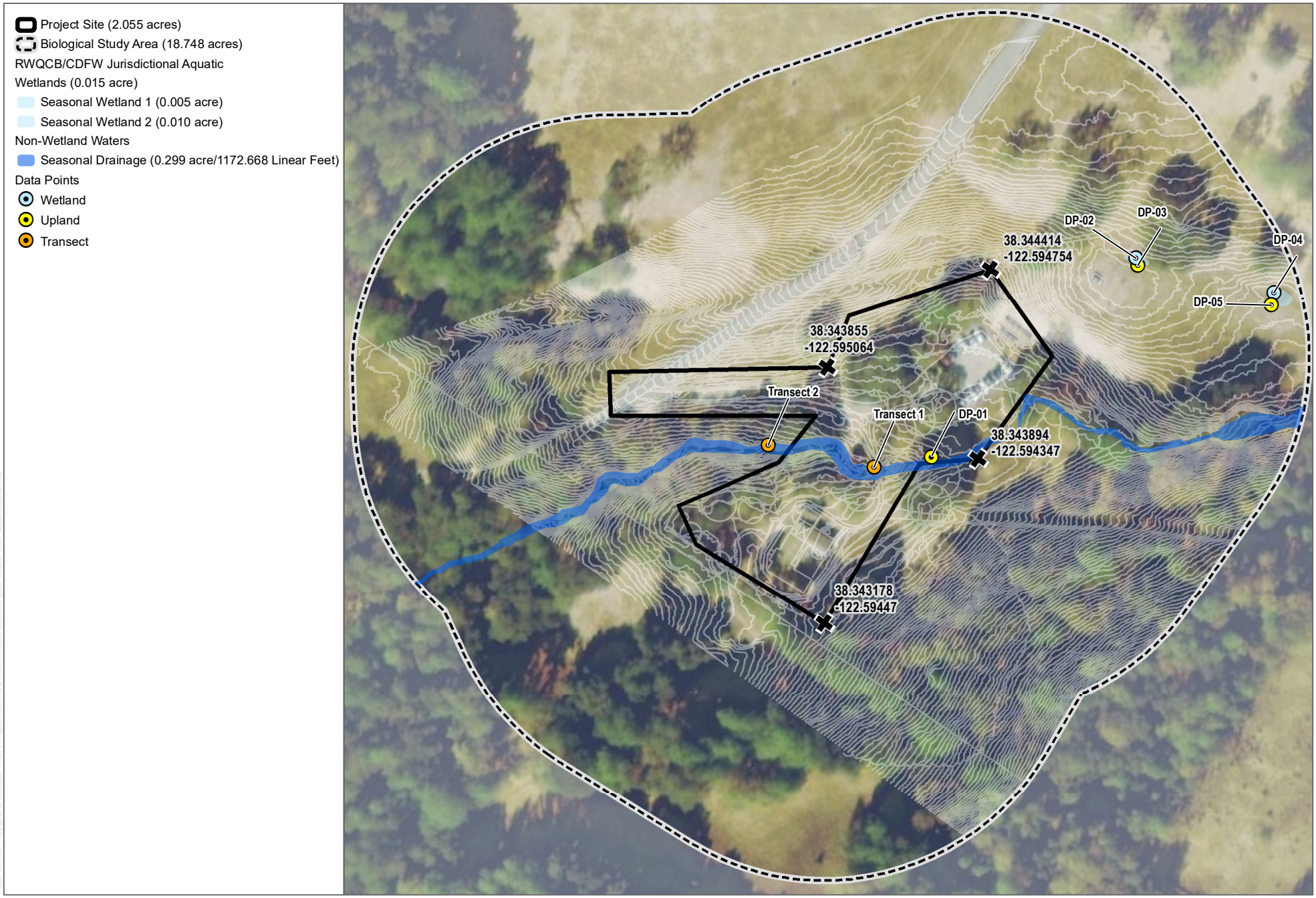

SOURCE: ESRI 2020, EBA Engineering 2019

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0 75 150 Feet

FIGURE 5

RWQCB/CDFW Jurisdictional Aquatic Resources

Fairfield Osborn Preserve Visitor Center Improvement Project

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SOURCE: ESRI 2021, Marian 2021

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Figure 6

Environmental Impact Footprint

Sonoma State Fairfield Osborne Preserve

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3.5 Cultural Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
V. CULTURAL RESOURCES – Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource pursuant to §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 dedicated cemeteries?	☐	☒	☐	☐

a-b) ***Would the project cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5?***

Would the project cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?

A cultural resources study was prepared for the proposed project by the Anthropological Studies Center at Sonoma State University (December 2020), and is a confidential appendix to this MND. This study began with an archival review that: 1) determined whether archaeological or other cultural resources have been recorded within or near the project site, and 2) assessed the likelihood of identifying unrecorded resources in the project site during ground disturbance, based on archaeological, ethnographic, and historical documents, and on the distribution and environmental settings of nearby known cultural resources.

The records search identified one previously recorded cultural resource within the Area of Potential Effect (APE) (Figure 7): a multi-component historic-era archaeological site consisting of a house pad with a small artifact concentration, three stacked rock fences (also referred to as stone walls), a spring box, and three non-native trees (one eucalyptus, one cypress, and one willow). An east-west dry-laid stone wall passes near the project site. This feature would be avoided and preserved in place. All other features associated with this multicomponent site are outside of the project's APE.

The APE is located in a geological situation where the Holocene-aged deposits are fairly shallow. Thus, the potential exists for archaeological resources to be present near the surface. Past grading and construction of the visitor center has clearly affected the geological situation such that it is not expected that much archaeological material, were it present, to have survived in and around the APE. A field study of five hand-auger tests took place in July, 2021 (the results of which are in a confidential appendix to this MND). The results indicated that although buried cultural materials may be present, a substantial site with developed subsurface deposits is not likely given the soil conditions within the first 20 inches. However, given the overall sensitivity of the landscape, there remains the potential for accidental discovery of cultural resources. Therefore, the potential impact to historic-era and prehistoric cultural resources is considered significant.

MM CUL-1 requires contractor training, archaeological monitoring measures, and discovery protocols to avoid impacts to previously unidentified resources. If significant cultural or tribal cultural resources are discovered, avoidance or preservation in place shall be the preferred treatment. Given the limited subsurface work associated with the project, which is limited to installation of a fire protection water line and drainage improvements, avoidance is considered feasible. Construction of the gravel parking lot is designed to avoid subsurface disturbance (in order to protect trees). Similarly, construction of accessible paved pathways would require only minimal grading and excavation (to set concrete forms). With implementation of MM CUL-1, impacts related to known and previously undiscovered historic-era and prehistoric cultural resources would be less than significant with mitigation.

c) Would the project disturb any human remains, including those interred outside of dedicated cemeteries?

Although no human remains were recorded or detected on the project site during survey, project construction and ground-disturbing activities have the potential to uncover and impact previously unrecorded human remains. This would be a potentially significant effect. The project would comply with Health and Safety Code Section 7050.5, which requires that in the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the remains are discovered has determined whether or not the remains are subject to the coroner's authority. If the human remains are of Native American origin, the coroner must notify NAHC within 24 hours of this identification. These requirements are incorporated into MM CUL-2. The project impact would be less than significant with mitigation.

Mitigation Measures

MM CUL-1 The following archaeological monitoring measures shall be implemented to avoid impacts to previously unidentified archaeological resources.

- Contractor Training. Archaeological and Tribal Resource awareness training shall be provided to all contractors working on the project site by the project archaeologist who meets the Secretary of the Interior's professional qualifications and the Federated Indians of Graton Rancheria (FIGR) Tribal Historic Preservation Officer (THPO) or a THPO-designated representative. The training shall include awareness for expected archaeological and tribal resources, how to identify the evidence, and the appropriate protocol in the event of the discovery of suspected archaeological materials. This will include on-site communication with construction personnel regarding the standard provisions during the unanticipated discovery of potentially important archaeological or other cultural materials.
- Archaeological Monitoring. Full-time monitoring of ground disturbance activities will be initially carried out in accordance with the construction schedule and in coordination with the tribal monitor, as specified in MM-TCR-2. All monitors must be notified a reasonable time before ground disturbance activities are to begin. All monitoring activities will be documented in daily logs, and any changes to monitoring strategies will be noted. The project archaeologist and THPO or THPO-designated representative may agree to implement a reduced monitoring schedule.
- Discovery Protocols. If an archaeological deposit is encountered, all ground-disturbing activities, including excavation and removal of soil, in a radius of 50 feet of the deposit shall

cease. This radius may be adjusted by the archaeologist, in coordination with the THPO or THPO-designated representative, as appropriate in relation to the nature of the deposit. The archaeologist shall be empowered to temporarily redirect demolition/excavation/construction activities and equipment away from the find until the deposit is evaluated in consultation with the THPO and treated as necessary. Potential archaeological resources will be evaluated in place – soil will not moved and stockpiled for further evaluation. A second archaeologist and tribal monitor may be required to monitor continuing construction elsewhere on the project site while the archaeological discovery is assessed. If the archaeologist, working in coordination with the THPO or THPO-designated representative, determines that the discovery is non-significant (i.e., is not a potential historical resource or unique archaeological resource pursuant to CEQA), the find shall be noted, and construction may proceed.

- If the archaeologist, working in coordination with the THPO or THPO-designated representative, determines that the find may constitute a historical resource, a cultural resource, or a tribal cultural resource, the archaeologist shall immediately notify the project manager and the construction supervisor. The archaeologist shall consult with the construction supervisor and project manager regarding the necessity for formal evaluation and treatment. In this circumstance, a treatment plan pertaining to resources of Native American origin or importance shall be developed in consultation with and approved by the Tribe. If the resource constitutes a historical resource, cultural resource, or tribal cultural resource pursuant to CEQA, avoidance or preservation in place shall be the preferred treatment.
- The requirements of this mitigation measure shall be incorporated into the Cultural Resources and Tribal Cultural Resources Management and Discovery Plan to be prepared pursuant to mitigation measure TCR-1.

MM CUL-2: The dry-laid stone wall within the APE shall be avoided and demarcated with environmentally sensitive area (ESA) fencing. The project archaeologist shall periodically inspect the ESA fencing to ensure it is maintained throughout the construction period. The requirements of this mitigation measure shall be incorporated into the Cultural Resources and Tribal Cultural Resources Management and Discovery Plan to be prepared pursuant to mitigation measure TCR-1. Long term protection, following the construction period, shall be addressed in mitigation measure TCR-3.

MM CUL-3: If any human remains are found, the Sonoma County coroner shall be immediately notified of the discovery. The remains will be protected in place and no further excavation or disturbance of the discovery site and a 200-foot radius shall occur until the County coroner has determined if the find is potentially human. If the County coroner determines that the remains are believed to be Native American, he or she shall notify the Native American Heritage Commission (NAHC) within 24 hours. The NAHC will identify the person or persons believed to be the most likely descendants from the deceased Native American, which is anticipated to be the FIGR most likely descendant, given the location of the project and the history and pre-history of the area. The most likely descendent may make recommendations regarding the means of treating or disposing of the remains with appropriate dignity. Project-related ground disturbance in the vicinity of the find shall not resume until all statutory requirements have been met and evidence of completion has been submitted to SSU and the NAHC. The requirements of this mitigation measure shall be incorporated into the Cultural Resources and Tribal Cultural Resources Management and Discovery Plan to be prepared pursuant to mitigation measure TCR-1.

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SOURCE: ESRI 2018, Marian 2020

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FIGURE 7

APE (Area of Potential Effect)

Sonoma State Fairfield Osborne Preserve

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3.6 Energy

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VI. Energy – Would the project:				
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?	☐	☐	☒	☐

Analysis

Electricity. Pacific Gas & Electric (PG&E) is the utility provider for Sonoma County. However, the visitor center's electricity supply comes from a photovoltaic solar array within the preserve.

Natural Gas. PG&E provides natural gas service to most of Northern California. PG&E customers consumed approximately 4,715 million therms[12] of natural gas in 2017 (CEC 2017b). Natural gas is available from a variety of in-state and out-of-state sources and is provided throughout the state in response to market supply and demand.

Petroleum. According to the U.S. Energy Information Administration, California used approximately 683 million barrels of petroleum in 2017 (EIA 2019). This equates to a daily use of approximately 1.9 million barrels of petroleum. There are 42 U.S. gallons in a barrel, so California consumes approximately 78.6 million gallons of petroleum per day, adding up to an annual consumption of 29 billion gallons of petroleum. However, technological advances, market trends, consumer behavior, and government policies could result in significant changes in fuel consumption by type and in total. At the federal and state levels, various policies, rules, and regulations have been enacted to improve vehicle fuel efficiency, promote the development and use of alternative fuels, reduce transportation-source air pollutants and GHG emissions, and reduce vehicle miles traveled.

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

Construction of the proposed project would require the use of electric power supplied by the on-site solar array and a potential temporary generator for as-necessary lighting and electronic equipment. The amount of electricity used during construction would be minimal because typical energy demand stems from the use of electrically powered equipment. This electricity demand would be temporary and would cease upon completion of construction; therefore, the proposed project would not adversely impact the available electricity supply. During construction, natural gas would typically not be consumed on the project site. The majority of the energy used during construction would be from petroleum, as detailed below.

[12] One therm is equal to 100,000 British thermal units or 100 kilo-British thermal units.

Heavy-duty construction equipment associated with construction activities would rely on diesel fuel, as would haul and vendor trucks involved in delivery of materials to the project site. Construction workers would travel to and from the project site throughout the duration of construction. It is assumed in this analysis that construction workers would travel to and from the site in gasoline-powered vehicles.

Heavy-duty construction equipment of various types would be used for construction, primarily during expansion of the parking lot. Appendix A of this IS/MND lists the assumed equipment to be used for each phase of construction.

Fuel consumption from construction equipment and on-road vehicles was estimated by converting the total carbon dioxide (CO_2) emissions from each construction phase to gallons using the conversion factors for CO_2 to gallons of gasoline or diesel. The conversion factor for gasoline is 8.78 kilograms per metric ton CO_2 per gallon, and the conversion factor for diesel is 10.21 kilograms per metric ton CO_2 per gallon (The Climate Registry 2019). Fuel consumption estimates for off-road equipment, trucks, and total worker vehicles are provided in Table 3.6-1.

Table 3.6-1. Construction Equipment, Truck, and Worker Vehicle Petroleum Demand

Phase	MT CO_2	Kg CO_2/ Gallon	Gallons
Off-Road Construction Equipment (Diesel)	96.39	10.21	9,441.18
Haul Trucks (Diesel)	8.81	10.21	863.01
Vendor Trucks (Diesel)	4.09	10.21	401.02
Worker Vehicles (Gasoline)	6.51	8.78	741.34
		Total	**11,446.54**

Sources: Equipment and on-road vehicle CO_2 (Appendix A); kg CO_2/Gallon (The Climate Registry 2019).
Notes: MT = metric ton; CO_2 = carbon dioxide; kg = kilogram.

In summary, construction of the project is conservatively anticipated to consume a total of 11,447 gallons of petroleum over a period of approximately 88 days. Notably, the proposed project will be subject to CARB's In-Use Off-Road Diesel Vehicle Regulation that applies to certain off-road diesel engines, vehicles, or equipment greater than 25 horsepower. The regulation: (1) imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; (2) requires all vehicles to be reported to CARB (using the Diesel Off-Road Online Reporting System) and labeled; (3) restricts the adding of older vehicles into fleets starting on January 1, 2014; and 4) requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies (i.e., exhaust retrofits). The fleet must either show that its fleet average index was less than or equal to the calculated fleet average target rate, or that the fleet has met the Best Achievable Control Technology (BACT) requirements. Overall, because the project would not be unusual as compared to overall local and regional demand for energy resources and would not involve characteristics that require equipment that would be less energy-efficient than at comparable construction sites in the region or state, the project construction would not result in wasteful, inefficient, or unnecessary consumption of petroleum. In regard to long-term operations, the project would not result in increased energy consumption, as the visitor center is supplied by an existing PV solar energy system. Energy impacts related to wasteful, inefficient or unnecessary consumption would be **less than significant**.

b) Would the project conflict with or obstruct a state or local plan for renewable energy or energy efficiency?

In 2014, the California State University (CSU) adopted a Sustainability Policy (CSU 2014). The 2014 Sustainability Policy seeks to integrate sustainability into all facets of the CSU, including academics, facilities operations, the built environment, and student life. The 29 implementing policies contained in the Sustainability Policy include measures to reduce the GHG emissions from the CSU system and reduce reliance on fossil fuels. Although the policy does not specifically address construction, as noted above the project construction energy usage would be less than significant. The facility is powered by a renewable energy source, PV solar, and the project operations would not change the on-site energy source. All improvements made to the visitor center would comply with the current (2019) California Building Energy Efficiency Standards, also known as Title 24 (of the California Code of Regulations). Potential conflicts with energy policies or plans would be less than significant.

3.7 Geology and Soils

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
VII. GEOLOGY AND SOILS – Would the 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? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
i) ii) Strong seismic ground shaking?	☐	☐	☒	☐
ii) iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iii) 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?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☒	☐

a) Would the project 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?

The project area does not lie within a designated Alquist-Priolo Special Studies Zone (DOC 2015).

A Geotechnical Study Report (geotechnical report) was prepared by RGH Consultants in February 2020 for the proposed project and is provided in Appendix D of this IS/MND. The purpose of this report was to generate geotechnical information for the design and construction of the project. The study included review of selected published geologic data pertinent to the site; evaluation of subsurface conditions with borings and laboratory tests; and analysis of field and laboratory data.

According to the geotechnical report, the site is within an area affected by strong seismic activity and future seismic shaking should be anticipated at the site. The closest quaternary-age fault to the site is the Rodgers Creek Fault located approximately 1-mile east of the site. The proposed project would be designed and constructed in adherence with current standards for earthquake resistant construction in the California Building Code (CBC) and the seismic design criteria recommended in the geotechnical report. As the proposed project would not build any new enclosed or habitable structures, the risk of loss, injury, or death from strong seismic ground shaking would not significantly change from current conditions. With consideration of the above, impacts would be less than significant.

iii) Seismic-related ground failure, including liquefaction?

Liquefaction is a type of ground failure that involves the temporary transformation of soil into a fluid mass during strong earthquake ground shaking due to an increase in pore water pressure. The subsurface materials encountered in site borings consist of clays with varying amounts of sand, gravel, and bedrock

blocks. The geotechnical report determined that these materials are not susceptible to liquefaction, and therefore the potential for liquefaction at the project site is low. Impacts would be less than significant.

iv) Landslides?

Published geologic maps reviewed in the geotechnical report indicate the property is underlain by landslides and is located in an area of probable landslide deposits. RGH Consultants did not observe active landslides at the site during their study. The property extends primarily over relatively level to moderately sloping terrain. None of the proposed improvements would affect the occurrence of landslides. The proposed project does not include the construction of any new, enclosed or habitable structures that would pose new risks. Additionally, the proposed project would be constructed and designed in adherence to the recommendations in the geotechnical report. Therefore, impacts would be less than significant.

b) Would the project result in substantial soil erosion or the loss of topsoil?

The geotechnical report determined that because of topography and location, the site will be impacted by surface runoff. Surface runoff typically sheet flows over the ground surface but can be concentrated by the planned site grading, landscaping, and drainage. Therefore, it will be necessary to divert surface runoff around improvements to provide positive drainage away from structures. The geotechnical report includes recommendations to minimize impacts of soil erosion from surface runoff, such as ensuring that surface drainage gradients slope away from building foundations in accordance with the requirements of the CBC. With adherence to the recommendations in the geotechnical report and the California Building Code, impacts would be less than significant.

c) Would the project 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?

Due to the site soils and location, the Preserve site may be subject to unstable soils or geology. As discussed previously, the project site is located within a large landslide. Landslide debris can be susceptible to lurching, a phenomenon that occurs during earthquakes when slopes or manmade embankments yield and displace in the unsupported direction. In the more immediate project area, the adjacent slopes are generally not steep and the landslide debris encountered in site borings were determined to be of relatively strong materials. Therefore, the geotechnical report states that the potential for localized lurching to impact the proposed improvements at the site is low. The proposed project would not contribute to localized lurching of the landslide debris.

Weak, porous surface soil, such as that found at the site, appears strong when dry but will lose strength rapidly and settle under the load of fills, foundations, slabs, and pavements as its moisture content increases. Soil stability can be achieved by excavating the weak soil and replacing it as properly compacted fill. The proposed project would adhere to the recommendations in the geotechnical report, including excavating weak soil and replacing with properly compacted fill to increase soil stability, and constructing pavements during the dry season. With adherence to these recommendations, impacts would be less than significant.

d) Would the project 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?

Expansive surface soil shrinks and swells as moisture is gained and lost throughout the yearly weather cycle. Near the surface, the resulting movements can heave and crack lightly loaded shallow foundations, slabs, and pavements. The geotechnical report determined that the project site soils are expansive. The zone of significant moisture variation (active layer) is dependent on the expansion potential of the soil and the extent of the dry season. For the proposed project site, the active layer is considered to be about 3 feet. The proposed project would adhere to the recommendations in the geotechnical report to obtain stable foundation support below this active layer. This includes additional foundation support with deepened spread footings, moistening of soil to close all cracks prior to concrete placement, and excavation of expansive surface materials at least 3 feet beyond the edge of the cement concrete pathways, gravel driveway, parking, cement concrete flatwork, and asphalt concrete pavements. With adherence to these recommendations, impacts would be less than significant.

e) Would the project 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?

The project site is currently served by a septic system. There would be no changes that would affect current operations. There would be no impact.

f) Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

There are no known paleontological resources onsite. It is unlikely that previously unknown paleontological resources would be encountered during future site grading and construction given the limited scope of construction and the lack of deep excavation. Impacts to paleontological resources would be less than significant.

3.8 Greenhouse Gas Emissions

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

Analysis

Climate change refers to any significant change in measures of climate, such as temperature, precipitation, or wind patterns, lasting for an extended period of time (decades or longer). The Earth's temperature depends on the balance between energy entering and leaving the planet's system, and many factors (natural and human) can cause changes in Earth's energy balance. The greenhouse effect is the trapping and build-up of heat in the atmosphere (troposphere) near the Earth's surface. The greenhouse effect is a natural process that contributes to regulating the Earth's temperature, and it creates a livable environment on Earth. Human activities that emit additional GHGs to the atmosphere increase the amount of infrared radiation that gets absorbed before escaping into space, thus enhancing the greenhouse effect and causing the Earth's surface temperature to rise. Global climate change is a cumulative impact; a project contributes to this impact through its incremental contribution combined with the cumulative increase of all other sources of GHGs. Thus, GHG impacts are recognized exclusively as cumulative impacts (CAPCOA 2008).

A GHG is any gas that absorbs infrared radiation in the atmosphere; in other words, GHGs trap heat in the atmosphere. As defined in California Health and Safety Code Section 38505(g) for purposes of administering many of the state's primary GHG emissions reduction programs, GHGs include CO2, methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), sulfur hexafluoride (SF6), and nitrogen trifluoride (NF3) (see also 14 CCR 15364.5). The three GHGs evaluated herein are CO2, CH4, and N2O. Emissions of HFCs, PFCs, SF6, and NF3 are generally associated with industrial activities including the manufacturing of electrical components, heavy-duty air conditioning units, and insulation of electrical transmission equipment (substations, power lines, and switch gears.). Therefore, emissions of these GHGs were not evaluated or estimated in this analysis because the project would not include these activities or components and would not generate HFCs, PFCs, SF6, and NF3 in measurable quantities.

Gases in the atmosphere can contribute to climate change both directly and indirectly.[13] The Intergovernmental Panel on Climate Change developed the global warming potential (GWP) concept to compare the ability of each GHG to trap heat in the atmosphere relative to another gas. The reference gas used is CO_2; therefore, GWP-weighted emissions are measured in metric tons of CO_2 equivalent (MT CO_2e). Consistent with CalEEMod Version 2016.3.2, this GHG emissions analysis assumed the GWP for CH_4 is 25 (emissions of 1 MT of CH_4 are equivalent to emissions of 25 MT of CO_2), and the GWP for N_2O is 298, based on the Intergovernmental Panel on Climate Change Fourth Assessment Report (IPCC 2007).

Separate thresholds of significance have been established by the BAAQMD for operational emissions from stationary sources (such as generators, furnaces, and boilers) and nonstationary sources (such as on-road vehicles) (BAAQMD 2017a). The threshold for stationary sources is 10,000 MT CO_2e per year (i.e., emissions above this level may be considered significant). For nonstationary sources, the following three separate thresholds have been established:

- Compliance with a Qualified Greenhouse Gas Reduction Strategy (i.e., if a project is found to be out of compliance with a Qualified Greenhouse Gas Reduction Strategy, its GHG emissions may be considered significant).
- 1,100 MT CO_2e per year (i.e., emissions above this level may be considered significant).
- 4.6 MT CO2e per service population per year (i.e., emissions above this level may be considered significant). (Service population is the sum of residents plus employees expected for a development project.)

[13] Direct effects occur when the gas itself absorbs radiation. Indirect radiative forcing occurs when chemical transformations of the substance produce other GHGs, when a gas influences the atmospheric lifetimes of other gases, and/or when a gas affects atmospheric processes that alter the radiative balance of the Earth (e.g., affect cloud formation or albedo) (EPA 2017).

As the project site is not subject to a qualified greenhouse gas reduction strategy and the service population at the site is minimal, the quantitative threshold of 1,100 MT CO_2e annually is applied to this analysis. If the project-related GHG emissions would exceed this threshold then, consistent with BAAQMD CEQA Air Quality Guidelines, it would be considered to have a cumulatively considerable contribution of GHG emissions and a cumulatively significant impact on climate change.

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

Construction of the proposed project would result in GHG emissions primarily associated with use of off-road construction equipment, vendor trucks, and worker vehicles. Since the BAAQMD has not established construction-phase GHG thresholds, construction GHG emissions were amortized assuming a 30-year development life after completion of construction and were compared to the BAAQMD operational GHG threshold. A detailed depiction of the construction schedule—including information regarding phasing, equipment utilized during each phase, trucks, and worker vehicles—is included in Appendix A. The estimated project-generated GHG emissions from construction activities are shown in Table 3.8-1.

Table 3.8-1. Estimated Annual Construction GHG Emissions

	CO_2	CH_4	N_2O	CO_2e
Year	Metric Tons per Year			
2022	115.81	0.02	0.00	116.36
			Amortized Emissions (over 30 years)	3.88

Notes: CO_2 = carbon dioxide; CH_4 = methane; N_2O = nitrous oxide; CO_2e = carbon dioxide equivalent.
See Appendix A for complete results.

As shown in Table 3.8-1, the estimated total GHG emissions during construction of the proposed project would be approximately 116 MT CO_2e. Estimated project-generated construction emissions amortized over 30 years would be approximately 4 MT CO_2e per year, which would not exceed the BAAQMD threshold of 1,100 MT CO_2e per year. As with project-generated construction air quality pollutant emissions, GHG emissions generated during the construction of the proposed project would be short-term in nature, lasting only the duration of the construction period, and would not represent a long-term source of GHG emissions. In regard to long-term operations, the project would not result in a substantial number of increased visitors or new sources of operational GHG emissions. Based on the above considerations, the project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. This impact would be less than significant.

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

On April 5, 2019, SSU President Judy Sakaki signed the President's Climate Leadership Commitment, which initiated a 3-year planning effort to develop a Climate Action Plan for the campus and roadmap for achieving carbon neutrality for electrical power, integrating sustainability and resilience into the student experience, and collaborating with the community to strengthen resiliency of the North Bay Area in response to climate change (Sonoma State University 2019). Currently, although there are no mandatory GHG plans, policies,

or regulations or finalized agency guidelines that would apply to implementation of the proposed project, a description of relevant plans with GHG reduction strategies is provided below.

Project Consistency with the Scoping Plan

The Scoping Plan (approved by CARB in 2008 and updated in 2014 and 2017) provides a framework for actions to reduce California's GHG emissions and requires CARB and other state agencies to adopt regulations and other initiatives to reduce GHGs. The Scoping Plan is not directly applicable to specific projects, nor is it intended to be used for project-level evaluations.[14] Under the Scoping Plan, however, there are several state regulatory measures aimed at the identification and reduction of GHG emissions. CARB and other state agencies have adopted many of the measures identified in the Scoping Plan. Most of these measures focus on area source emissions (e.g., energy usage, high-GWP GHGs in consumer products) and changes to the vehicle fleet (i.e., hybrid, electric, and more fuel-efficient vehicles) and associated fuels (e.g., LCFS), among others.

The Scoping Plan recommends strategies for implementation at the statewide level to meet the goals of AB 32 and establishes an overall framework for the measures that will be adopted to reduce California's GHG emissions. To the extent that these regulations are applicable to the project, its inhabitants, or uses, the project would comply with all regulations adopted in furtherance of the Scoping Plan to the extent required by law.

Project Consistency with the MTC and ABAG's Plan Bay Area 2040

The *Plan Bay Area 2040* (MTC and ABAG 2017) is a regional growth management strategy that targets per capita GHG reduction from passenger vehicles and light-duty trucks for the San Francisco Bay Area pursuant to SB 375. In addition to demonstrating the region's ability to attain and exceed the GHG emission-reduction targets set forth by CARB, the *Plan Bay Area 2040* outlines a series of actions and strategies for integrating the transportation network with an overall land use pattern that responds to projected growth, housing needs, changing demographics, and transportation demands. Within the *Plan Bay Area 2040*, the core strategy includes "focused growth" in existing communities along existing transportation networks. The key to implementing the focused growth strategy are Priority Development Areas (PDAs) and Priority Conservative Areas (PCAs). In addition, the Metropolitan Transportation Commission and Association of Bay Area Governments Executive Board established seven goals and 13 performance targets to measure *Plan Bay Area 2040*'s effectiveness in addressing the major challenges facing the region. The project would result in outdoor and indoor improvements to an existing facility and would not result in additional long-term operational emissions. Overall, the proposed project would not conflict with applicable goals and strategies set forth in the *Plan Bay Area 2040*.

Project Consistency with Senate Bill 32 and Executive Order S-3-05

The project would not impede the attainment of the GHG reduction goals for 2030 or 2050 identified in Executive Order (EO) S-3-05 and Senate Bill (SB) 32. EO S-3-05 establishes the following goals: GHG

[14] The Final Statement of Reasons for the amendments to the CEQA Guidelines reiterates the statement in the Initial Statement of Reasons that "[t]he Scoping Plan may not be appropriate for use in determining the significance of individual projects because it is conceptual at this stage and relies on the future development of regulations to implement the strategies identified in the Scoping Plan" (CNRA 2009).

emissions should be reduced to 2000 levels by 2010, to 1990 levels by 2020, and to 80% below 1990 levels by 2050. SB 32 establishes for a statewide GHG emissions reduction target whereby CARB, in adopting rules and regulations to achieve the maximum technologically feasible and cost-effective GHG emissions reductions, shall ensure that statewide GHG emissions are reduced to at least 40% below 1990 levels by December 31, 2030. While there are no established protocols or thresholds of significance for that future year analysis, CARB forecasts that compliance with the current Scoping Plan puts the state on a trajectory of meeting these long-term GHG goals, although the specific path to compliance is unknown (CARB 2014).

To begin, CARB has expressed optimism with regard to both the 2030 and 2050 goals. It states in the First Update to the Climate Change Scoping Plan that "California is on track to meet the near-term 2020 GHG emissions limit and is well positioned to maintain and continue reductions beyond 2020 as required by AB 32" (CARB 2014). With regard to the 2050 target for reducing GHG emissions to 80% below 1990 levels, the First Update states the following (CARB 2014):

> This level of reduction is achievable in California. In fact, if California realizes the expected benefits of existing policy goals (such as 12,000 megawatts of renewable distributed generation by 2020, net zero energy homes after 2020, existing building retrofits under AB 758, and others) it could reduce emissions by 2030 to levels squarely in line with those needed in the developed world and to stay on track to reduce emissions to 80% below 1990 levels by 2050. Additional measures, including locally driven measures and those necessary to meet federal air quality standards in 2032, could lead to even greater emission reductions.

In other words, CARB believes that the state is on a trajectory to meet the 2030 and 2050 GHG reduction targets set forth in AB 32, SB 32, and EO S-3-05. This is confirmed in the 2017 Scoping Plan, which states (CARB 2017):

> This Scoping Plan builds upon the successful framework established by the Initial Scoping Plan and First Update, while identifying new, technologically feasible, and cost-effective strategies to ensure that California meets its GHG reduction targets in a way that promotes and rewards innovation, continues to foster economic growth, and delivers improvements to the environment and public health, including in disadvantaged communities. The Plan includes policies to require direct GHG reductions at some of the State's largest stationary sources and mobile sources. These policies include the use of lower GHG fuels, efficiency regulations, and the Cap-and-Trade Program, which constrains and reduces emissions at covered sources.

The project would not interfere with implementation of any of the above-described GHG reduction goals for 2030 or 2050. In addition, as discussed previously, the project is consistent with the *Plan Bay Area 2040*, as well as measures in the Scoping Plan and would not conflict with the state's trajectory toward future GHG reductions. Based on the above considerations, the project would not conflict with an applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of GHGs, and no mitigation is required. This impact would be less than significant.

3.9 Hazards and Hazardous Materials

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
IX. HAZARDS AND HAZARDOUS MATERIALS – Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site that 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 or excessive noise 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?	☐	☒	☐	☐

a-b) Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

Would the project 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?

The project would be required to comply with existing regulations related to transport, use and disposal of hazardous materials during construction. Hazardous materials and hazardous wastes are regulated by federal, State and local agencies, including the California Environmental Protection Agency (Cal EPA) and the State Department of Toxic Substances Control (DTSC). The visitor's center does not use or store hazardous materials as part of current or proposed operations. Additionally, the project site does not contain any obvious conditions indicative of any prior releases or threatened releases of hazardous substances, pollutants, contaminants, petroleum and petroleum products. The visitor center structure is not known to contain hazardous materials such as asbestos or lead paint that could be exposed during construction. The proposed project would comply with all regulations related to hazardous materials and would prevent a significant risk of upset or accident conditions that would involve the release of hazardous materials into the environment. Impacts would be less than significant.

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

The proposed project would not emit hazardous emissions or handle hazardous materials or waste within one-quarter mile of a school. The closest school is Monte Vista Elementary School, located in the City of Rohnert Park approximately 5 miles southwest of the project site. Therefore, there would be no impact.

d) Would the project be located on a site that 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?

Based on a search of the Department of Toxic Substances Control (DTSC) EnviroStor database, the project is not a site with known contamination (DTSC 2020). The project is not located on a hazardous materials site and there would be no impact.

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 or excessive noise for people residing or working in the project area?

The proposed project site is not within an airport land use plan or within two miles of a public airport or public use airport. The closest airport is the Petaluma Municipal Airport located approximately than 6 miles south of the proposed project site. There would be no impact.

f) Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

The proposed project would not impair any emergency response or evacuation plans. The existing parking lot would be enlarged to meet CalFire turnaround requirements (or alternatively a "hammerhead" turnaround installed). This would increase emergency response capabilities at the site. Thus, impacts would be less than significant.

g) Would the project expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?

The proposed project is within a State Responsibility Area (SRA) and is not designated as a Very High Fire Hazard Severity Zone by CAL FIRE. The project site is within Moderate and High Fire Hazard Severity Zones. The closest Very High Fire Hazard Severity Zone is located in a State Responsibility Area (SRA) approximately 5 miles east of the proposed project site (CAL FIRE 2007). The County's Fire Prevention Division provides fire protection and prevention services within the unincorporated areas of the County. Project construction would occur during the dry season and would be in an area that could potentially provide a source of fuel for wildland fires. SSU shall develop a Construction Fire Prevention Plan to address training construction personnel in proper fire prevention and suppression procedures. This is described in further detail in Section 3.20, Wildfire. MM WLD-1 describes what measures shall be included in the Construction Fire Prevention Plan, including requirements for vegetation clearance near construction activities. With adherence to MM WLD-1 and all applicable building and fire codes, impacts would be less than significant with mitigation.

Mitigation Measures

Refer to Section 3.20, Wildfire, for MM WLD-1.

3.10 Hydrology and Water Quality

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
X. HYDROLOGY AND WATER QUALITY – Would the project:				
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;	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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 a water quality control plan or sustainable groundwater management plan?	☐	☐	☐	☒

a) Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Project construction would require some earth-disturbing activities, including grading that could expose disturbed areas to rainfall and storm water runoff. The project area is small, less than one acre. With the exception of the bridge replacement and the adjacent pathways, the project area does not drain directly to the tributary to Copeland Creek. Any work performed within the streambed (below the top of bank) would be subject to a Streambed Alteration Agreement with the California Department of Fish and Wildlife, and a Clean Water Act Section 404 Permit with the Army Corps of Engineers. Routine requirements of these permits would include surface water protection measures.

For these reasons, construction impacts on stormwater quality would be less than significant.

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

Domestic water to the site is supplied by a well, located north of the creek and adjacent to the parking lot The project is limited to improvements to the visitor center, including renovations to the visitor center, construction of an outdoor circular seating area, improved pedestrian circulation, parking and emergency access, and improved wayfinding signage. The parking lot would be expanded to accommodate additional parking and a fire apparatus turn around. However, only a limited portion would be paved (areas associated with accessible parking spaces), and the rest would remain gravel. The project does not include any new or expanded uses that would require increased groundwater. An additional 12,020 gallons would be stored, in two on-site storage tanks, for fire safety purposes. The water storage tanks would be supplied by the existing groundwater well but would be used only for fire suppression and would not substantially increase water demand. The proposed improvements would not create a significant amount of impervious surface area that would interfere substantially with groundwater recharge, and would include low impact design features to retain runoff and encourage infiltration. Impacts to groundwater would be less than significant.

c) Would the project 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;

Construction activities have the potential to increase surface runoff and erosion (see also Section 3.7, Geology and Soils). The project therefore includes both temporary and permanent runoff controls. Landscaped swales would be located adjacent to the concrete pathway (on the northside of the path north of the creek, and to the east of the walkway at the visitors center, and on the north side of the parking lot. Two landscaped detention basins would be constructed. A basin west of the visitors center will receive surface runoff and stormwater from new drain inlets around the structure. The drainage swale north of the creek will drain into a landscaped detention basin where the swale terminates at the pedestrian bridge. Drainage inlets on the perimeter of the parking lot will flow to this detention basin, in addition to surface flows from the swale. In addition, dispersal trenches would prevent runoff from the visitors center and the gravel paved emergency vehicle turnaround (the "hammerhead" turnaround). Therefore, impacts would be less than significant.

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

The project site is located in unincorporated Sonoma County where there are no existing or planned storm water facilities. The proposed improvements would create a small amount of additional impervious surface area but would include new storm drain improvements to handle both additional project runoff and existing drainage concerns. Thus, there would be no impact.

iv) impede or redirect flood flows?

The proposed project is within an area of minimal flood hazard (FEMA 2019). There would be no impact.

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

The proposed project is within an area of minimal flood hazard (FEMA 2019) and is not located near any bodies of water that would pose tsunami or seiche risks. There would be no impact.

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

The North Coast Regional Water Quality Board has established a Basin Plan designed to provide a definitive program of actions to preserve, enhance, and protect all regional waters of the North Coast Region (NCRWQCB 2018). As discussed in the item 'b' discussion, above, the project does not include any uses that would increase groundwater usage, and the proposed improvements would not substantially impact surface water quality or groundwater recharge. As such, there would be no impact.

3.11 Land Use and Planning

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XI. LAND USE AND PLANNING – Would the project:				
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?	☐	☐	☐	☒

a) Would the project physically divide an established community?

Existing low-density rural residences are located to the East, South, and West of the project site. The proposed project would not divide an established community, as the site is currently developed with the existing Marjorie Osborn Education and Research Center and trail systems for teaching, gathering, and outdoor exploration. Therefore, the proposed project would not physically divide an established community. There would be no impact.

b) Would the project 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?

SSU is an entity of the CSU, which is a state agency, and is therefore not subject to local government planning and land use plans, policies, or regulations. SSU may consider, for informational purposes, aspects of local plans and policies for the communities surrounding the campus and its off-campus properties, when it is appropriate. . Accordingly, this IS/MND draws on the County's General Plan, the BVAP, and municipal code, which provide information regarding land use. The project site is designated in the County's General Plan as Resources and Rural Development (Sonoma County 2018a). The project site is zoned as a Resources and Rural Development District, Combining District Biotic Habitat and Scenic Resources (Sonoma County 2020). The purpose of the Resources and Rural Development District is to implement the provisions of the related category of the General Plan, namely to provide protection of lands needed for commercial timber production, geothermal production, aggregate resources production; lands needed for protection of watershed, fish and wildlife habitat, biotic resources, and for agricultural production activities that are not subject to all of the policies contained in the agricultural resources element of the General Plan. The Resources and Rural Development District is also intended to allow very low density residential development and recreational and visitor-serving uses where compatible with resource use and available public services. The existing and proposed visitor serving use, which provides educational opportunities based on the natural and cultural setting of the site, is consistent with the land use designation. The proposed project would protect the biotic and scenic resources of the site. Again, while the project site is consistent with local land use plans, SSU is not subject to local government planning and land use plans, policies, or regulations. Therefore, there would be no impact.

3.12 Mineral Resources

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

a) ***Would the project 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?***

The project site is currently developed with the existing Marjorie Osborn Education and Research Center and trail system and does not serve as a mineral resource recovery site. There are no known mineral resources existing on the project site (DOC 2015). Therefore, the proposed project would not impede extraction or result in the loss of availability of a known mineral resource, and no impact would occur.

b) ***Would the project 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 impact. See response to 3.12(a).

3.13 Noise

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIII. NOISE – Would the 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?	☐	☐	☐	☒
b) Generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒

a) Would the project result in 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?

The proposed project would result in a temporary increase in ambient noise from construction activities, and a negligible increase in ambient noise from the new project components. There are no noise-sensitive land uses located near the project site. The nearest noise-sensitive receptors would be residences approximately 0.3 miles to the west and north of the project site. Therefore, there would be no impact.

b) Would the project result in generation of excessive groundborne vibration or groundborne noise levels?

The proposed project would not create a permanent new source of excessive groundborne vibration or groundborne noise. A temporary increase, not anticipated to exceed prescribed thresholds, in groundborne vibration and noise may result from construction activities. The project would not include sources of excessive groundborne vibration such as pile driving. As described above, there are no sensitive receptors near the proposed project site. There would be no impact.

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?

The project site is not located within an airport land use plan or near a public or private airport/airstrip. The closest airport is the Petaluma Municipal Airport located approximately 6 miles to the south. There would be no impact.

3.14 Population and Housing

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIV. POPULATION AND HOUSING – Would the 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)?	☐	☐	☐	☒
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) ***Would the project 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)?***

The proposed project would include renovations to the visitor center, construction of an outdoor circular seating area and tiered seating, improved pedestrian circulation, parking and emergency access, and improved wayfinding signage. The proposed project would assist in the accommodation of large group educational events and additional parking spaces. The proposed project would not directly or indirectly induce substantial population growth. There would be no impact.

b) ***Would the project displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?***

The project site includes housing for one caretaker, which would not be affected by the project. No housing or people would be displaced; therefore, there would be no impact.

3.15 Public Services

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XV. PUBLIC SERVICES				
a) Would the project 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:				
iv) Fire protection?	☐	☐	☒	☐
v) Police protection?	☐	☐	☒	☐
vi) Schools?	☐	☐	☒	☐
vii) Parks?	☐	☐	☒	☐
viii) Other public facilities?	☐	☐	☐	☒

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

Fire protection?

The Fairfield Osborn Preserve receives fire protection services from the Rancho Adobe Fire Protection District. The nearest fire station to the Preserve is Station No. 2 (11000 Main Street, Penngrove, CA). The proposed project includes renovations and upgrades to an existing facility, and would not substantially increase demands on fire service. Proposed improvements will include a new fire turnaround or hammerhead turnaround to improve emergency access. Alteration of the existing visitor center would include replacement of existing fire alarm panel, which would communicate to the central monitoring station. Additionally, a fire separation between the classroom spaces in the visitor center (B occupancy class) and the adjoining caretaker's residence (R occupancy class) would be constructed. Further, two 6,500-gallon water tanks would be installed adjacent to the parking lot, north of the visitor's center, to provide water for emergency responders, as well as the installation of a dry hydrant to access the stored water. Therefore, the project would not increase the demand for fire protection services such that new or physically altered facilities, the construction of which could cause significant environmental impacts, would be required to ensure the continued adequate provision of those services. Impacts would be less than significant.

Police protection?

The project area receives police protection services from the Sonoma County Sheriff's Office. The Preserve is located within Zone 5: South Zone, which includes the unincorporated areas surrounding Petaluma, Rohnert Park, and Cotati. The proposed project includes renovations and upgrades to an existing facility, which would not substantially increase demands on police protection services such that new or physically

altered facilities, the construction of which could cause significant environmental impacts, would be required. Impacts would be less than significant.

Schools?

The proposed project includes renovations and upgrades to an existing educational facility managed by SSU. The visitor center would not be expanded beyond its existing 65-person occupancy maximum. The existing visitor center serves students in Sonoma County; changes to the center would not impact enrollment at local elementary or secondary schools. Therefore, the project would not require new or physically altered school facilities that could potentially cause significant environmental impacts. Impacts would be less than significant.

Parks?

The proposed project does not include the addition of any new residents that would require park and recreational amenities. Therefore, the project would not require new or physically altered parks or recreational facilities that could potentially cause significant environmental impacts. Impacts would be less than significant.

Other public facilities?

The proposed project would not affect any other public facilities. There would be no impact.

3.16 Recreation

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

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?

The proposed project would improve the visitor experience at the Preserve and further its educational purpose. The proposed project would not affect existing neighborhood or regional parks, and the demand

for neighborhood or regional park space would not be increased. Therefore, the proposed project would have a less than significant impact on existing neighborhood and regional parks.

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?

The proposed project includes renovations to the Marjorie Osborn Education and Research Center, including an expanded parking lot and the addition of an outdoor circular seating area and tiered seating. The effects of this construction are described in this Initial Study. With incorporation of feasible mitigation measures, the environmental effects of improving the facility would be less than significant.

3.17 Transportation

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVII. TRANSPORTATION – Would the project:				
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 a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
d) Result in inadequate emergency access?	☐	☐	☐	☒

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

The project would improve on-site parking, emergency access, and pedestrian circulation. No changes to the off-site circulation system would occur. Local (county) plans, policies and ordinances do not apply. The project would be consistent with California Fire Code and local fire district requirements for emergency access. Pedestrian improvements shall be consistent with Americans with Disabilities Act (ADA) requirements. The pedestrian bridge that traverses Copeland Creek will be resurfaced. Paths on the site will be reconstructed with a concrete cement surface and concrete surface for ADA compliance. The parking lot would be enlarged and would provide additional parking spaces. Signage would be added throughout the visitor center area to help with wayfinding. These project components would improve current facilities, and thus there would be no impact related to conflict with programs, plans, or policies addressing the circulation system.

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

According to CEQA Guidelines section 15064.3 Subdivision (b)(1), a project's vehicle miles traveled or VMT that exceeds an applicable threshold of significance may indicate a significant impact.

The project includes improvements to current site facilities. These improvements would not expand visitorship at the preserve, and are intended to serve current visitors. There would not be an increase in residents (one caretaker) or employees that would potentially increase service population VMT. The This impact would be less than significant.

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

The proposed project does not include any geometric design features such as sharp curves or dangerous intersections, and would not involve any new and incompatible uses. The project would include a turnaround for fire apparatus that would reduce potential conflicts during an emergency response. There would be no impact.

d) Would the project result in inadequate emergency access?

The proposed project includes enlarging the current parking lot to meet CalFire turnaround requirements as well as provide additional parking spaces. The lot's surface will remain gravel with the exception of saving for handicap accessible spaces. This project component would enhance emergency access. There would be no impact.

3.18 Tribal Cultural Resources

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XVIII. TRIBAL CULTURAL RESOURCES				
Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:				
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☒	☐	☐

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe?	☐	☒	☐	☐

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

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

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

Two California Native American tribes have requested notification of SSU projects per Public Resources Code Section 2108.31(b): the Federated Indians of Graton Rancheria (FIGR) and the Karuk Tribe. FIGR and the Karuk Tribe were provided formal notice under AB 52 on December 7, 2020. FIGR responded on December 8, 2020 to request consultation. The Karuk tribe did not respond to the consultation notice. However, SSU's Anthropology Department contacted the Karuk Tribe in 2019 while preparing the cultural resources report for the project site. At that time the Karuk Tribe indicated they would defer to FIGR regarding tribal cultural resources.

The landscape of Sonoma Mountain, including the project site, is considered by FIGR to be a tribal cultural resource. Additional specific tribal cultural resources include the trees on the project site, as well as the historic rock wall. Therefore, construction of the project may cause a substantial adverse change in the significance of a tribal cultural resource**.** The overall impact to the trees, rock wall, and the landscape of the project site, as a tribal cultural resources, is therefore considered in the physical impacts analyzed in this MND, such as aesthetics, biological, and hydrological impacts. In addition, the potential for previously unidentified tribal cultural resources, such as subsurface artifacts, represents a potentially significant impact.

MM TCR-1 requires the preparation of a Cultural Resources Management and Discovery Plan that would include provisions for the management and handling of previously unknown tribal cultural resources and

MM CR-2 requires tribal monitoring to be conducted during ground-disturbing activities. MM TCR-3 and TCR-4 address the long-term operation of the preserve and require the update of the Cultural Resources Inventory and Management Plan and preparation of an interpretive plan, respectively. With implementation of these measures, impacts to tribal cultural resources would be less than significant with mitigation.

Mitigation Measures

MM TCR-1 Prior to construction, a Cultural Resources and Tribal Cultural Resources Management and Discovery Plan shall be developed in consultation with the Federated Indians of Graton Rancheria (FIGR) Tribal Historic Preservation Officer (THPO) which, at a minimum, identifies the following: archaeological and Native American monitoring roles and responsibilities; avoidance measures, monitoring locations and monitored activities; soil monitoring protocols and logistics; key agency, contractor, archaeological, and tribal contacts; inadvertent cultural resources discovery protocols; protection of the recorded rock wall (see Mitigation Measure CUL-2); and post-construction reporting requirements. The intent of this plan shall be to integrate mitigation stipulated for cultural resources, including those identified in measures CUL-1 through CUL-3, while also being inclusive of preferred FIGR management strategies relating to tribal cultural resources for this location. Prior to finalization, this plan shall require review and approval by the lead agency project manager and FIGR THPO.

MM TCR-2 Full-time monitoring of ground disturbance activities by a tribal representative will be initially carried out in accordance with the construction schedule. Tribal monitoring may be adjusted based on the recommendation of the THPO, in consultation with the lead archaeologist and project manager. All monitors must be notified a reasonable time before ground disturbance activities are to begin and present to monitor excavation. Monitors shall also be notified of any planned trimming of trees. All monitoring activities will be documented in daily logs, and any changes to monitoring strategies will be noted. This measure shall be coordinated with the monitoring requirements of mitigation measure CUL-1.

MM TCR-3 Long-term mitigation of impacts to known and unknown Tribal Cultural Resources will be achieved by updating the existing Cultural Resources Inventory and Management Plan for the Preserve. SSU shall update the Cultural Resources Inventory and Management Plan in coordination and consultation with FIGR in order to align it with the current project, long-term interpretation, and the partnership between the Fairfield Osborn Preserve and FIGR. The updated Cultural Resources Inventory and Management Plan shall require, within 120 days of project approval, the University shall 1) commission the preparation by a qualified architectural historian and Secretary of the Interior qualified archaeologist of a formal Historic Resource Assessment, including a Department of Parks and Restoration (DPR) Primary Record Form 523, of the potentially historic multi-part resource that includes the rock wall, and 2) upon completion of the Historic Resource Assessment, initiate formal consultation with the State Office of Historic Preservation (OHP) and State Historic Preservation Officer (SHPO), in conjunction with FIGR, pursuant to PRC Section 5024 regarding the historic significance of the resource.

In the event that any future activities are proposed at the Fairfield Osborne Preserve that the University determines may affect the multi-part resource, the University shall 1) retain a qualified architectural historian and Secretary of the Interior qualified archaeologist to evaluate the potential for impacts, 2) initiate formal consultation with the State Office of Historic Preservation (OHP) and State Historic Preservation Officer (SHPO) pursuant to PRC Section 5024.5 to receive comments regarding potential impacts, and 3) implement all feasible measures to ensure long-term protection of the resource, which may include but is not limited to any necessary realignment of trails, the protection, selection, and planting of native plants for long-term landscape management including early and on-going tribal consultation and involvement in those decisions; the health and protection of trees; and the repatriation of tribal cultural resources and artifacts.

MM TCR-4 Long-term mitigation of impacts to known and unknown Tribal Cultural Resources shall further be achieved by the finalization of an interpretive plan to govern interpretive programming and features at the Preserve. SSU and FIGR are currently developing this interpretive plan as part of their long-term partnership.

3.19 Utilities and Service Systems

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XIX. UTILITIES AND SERVICE SYSTEMS – Would the project:				
a) Require or result in the relocation or construction of new or expanded water, wastewater treatment, or storm water 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?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
e) Comply with federal, state, and local management and reduction statutes and regulations related to solid waste?	☐	☐	☐	☒

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

The project site is not served by utilities. The project site is served by well water and a storage tank, located north of the creek, adjacent to the parking lot. The visitor center is served by a septic system. Electricity is provided by on-site solar facilities. A propane tank, located near the parking lot, serves the visitor center. The project includes an additional 12,020 gallons of water storage and a fire hydrant for fire protection purposes. The fire protection components would be within the project study area. The proposed project would not otherwise expand or construct utility systems. Impacts would be less than significant.

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

The proposed project would not increase demand for water. Additional water would be stored on-site, but would be used only for fire protection and would not significantly increase annual water consumption. The impact would be less than significant.

c) Would the project 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?

The project site is served by an existing septic system. There would be no impact to a wastewater treatment provider.

d) Would the project 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?

The proposed project would not result in the generation of additional solid waste. There would be no impact.

e) Would the project comply with federal, state, and local management and reduction statutes and regulations related to solid waste?

The proposed project would comply with all regulations related to solid waste. Other than temporary construction debris, the proposed project would not change the quantity or type of waste generated at the project site. There would be no impact.

3.20 Wildfire

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XX. WILDFIRE – If located in or near state responsibility areas or lands classified as very high fire hazard severity zones, would the project:				
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, power lines, 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?	☐	☒	☐	☐

a-d) ***Would the project substantially impair an adopted emergency response plan or emergency evacuation plan?***

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

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

Would the project 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?

The proposed project consists of renovations to the visitor center, construction of outdoor seating, as well as improved pedestrian circulation, parking and emergency access, and wayfinding signage, which would not substantially impair the Sonoma County/Operational Area Emergency Operations Plan. An emergency evacuation plan has not been adopted for the project area. The proposed project is within a State Responsibility Area (SRA) and is designated as a Moderate and High Fire Hazard Severity Zone by CAL FIRE.

The closest Very High Fire Hazard Severity Zone is located in a SRA approximately 5 miles east of the proposed project site (CAL FIRE 2007). The proposed project would not significantly modify the project area or landscape in a manner that would increase exposure for project occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire or increase the potential severity of wildfire or post-fire flooding. Further, the proposed project would comply with all applicable building and fire codes. The proposed project would include the construction of two 6,500-gallon storage tanks and a hydrant east of the parking lot and within the developed portion of the project area, which would support firefighting efforts and would not exacerbate fire risk or result in temporary or ongoing impacts to the environment.

As discussed previously in response to Question 3,9, Hazards & Hazardous Materials, project construction would occur during the dry season and would be in an area that could potentially provide a source of fuel for wildland fires. The use of heat or spark-generating tools and equipment used for project construction would also be potential wildfire ignition sources. SSU shall develop a Construction Fire Prevention Plan to address training construction personnel in proper fire prevention and suppression procedures, as described in MM WLD-1. With adherence to MM WLD-1 and all applicable building and fire codes, impacts would be less than significant.

Mitigation Measures

MM WLD-1 SSU shall, in consultation with the Tribe, develop and implement a Construction Fire Prevention Plan that addresses fire prevention practices and construction personnel trainings and provides details of fire-suppression procedures and equipment to be used during all construction-related activities. Information contained in the plan shall be included as part of project-related environmental awareness training. At minimum, the plan shall include the following:

- Procedures for minimizing potential ignition, including, but not limited to, vegetation clearing, parking requirements/restrictions, idling restrictions, smoking restrictions, proper use of gas-powered equipment, use of spark arrestors, and hot work restrictions;
- Work restrictions during Red Flag Warnings and High to Extreme Fire Danger days;
- Adequate water supply to service construction activities;
- Fire coordinator role and responsibility;
- Worker training for fire prevention, initial attack firefighting, and fire reporting;
- Emergency communication, response, and reporting procedures;
- Coordination with local fire agencies to facilitate agency access through the project site;
- Emergency contact information; and
- Demonstration of compliance with applicable plans and policies established by state and local agencies.

3.21 Mandatory Findings of Significance

	Potentially Significant Impact	Less Than Significant Impact With Mitigation Incorporated	Less Than Significant Impact	No Impact
XXI. MANDATORY FINDINGS OF SIGNIFICANCE				
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?	☐	☒	☐	☐

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?***

To ensure that the proposed project does not 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, or reduce the number or restrict the range of a rare or endangered plant or animal, MM BIO-1 through BIO-3 are required to ensure project construction or operation would not degrade the environment or adversely impact protected species as well as their habitat.

To ensure that cultural and paleontological resources impacts are reduced to less than significant levels, MM CUL-1 and CUL-2 are required to ensure the proper protocols are followed in the event such resources are unearthed during construction. Similarly, to ensure that tribal cultural resources impacts are

reduced to less than significant levels, MM TCR-1, TCR-2, TCR-3, and TCR-4 are required. Thus, there would be a less than significant impact with mitigation.

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)?

There are no other past, current, or proposed projects at the Preserve that would interact with the proposed project. The project's impacts are less than significant, or would be clearly reduced to a level less than significant with the implementation of mitigation measures (for biological resources, cultural resources, and wildfire risk). Therefore, the project's cumulative effects would be no impact.

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

The proposed project would not have any environmental effects that would cause substantial adverse effects to human beings. The only potentially significant effect that interacts with the human environment is wildfire risk. This impact would be reduced to less than significant with mitigation after implementation of MM-WLD-1.

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4 References and Preparers

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4.2 List of Preparers

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Appendix A
Air Quality Data

Fairfield Osborn Preserve Improvements

Sonoma-San Francisco County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 was adjusted based PG&E's reported intensity for 2017 from the PG&E Corporate Responsibility and Sustainability Report (2019)

Land Use - Modeling outdoor improvements and indoor improvements

Construction Phase - Outdoor/indoor improvements modeled assuming construction from 5/1/2020 - 9/1/2020

Off-road Equipment - Indoor improvements include new glass doors/windows, enlarging a restroom, kitchenette remodel, and floor/ceiling improvements

Off-road Equipment - Outdoor improvements consist of paving, pedestrian bridge repair, stone seating

Trips and VMT - Outdoor/indoor improvements assume 8 workers/3 workers and 1 vendor truck/1 vendor truck round trip per day

Architectural Coating - Conservatively assumed whole visitor interior and portion of exterior to be repainted

Vehicle Trips - No additional trips assumed

Consumer Products - No additional consumer products

Area Coating - No additional repainting

Energy Use - No new energy use assumed

Water And Wastewater - No additional water use assumed

Solid Waste - No additional solid waste assumed

Construction Off-road Equipment Mitigation - Water exposed area 2x/day and limit vehicle speed to 15 mph during construction

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Residential_Exterior	0.00	1,000.00
tblArchitecturalCoating	ConstArea_Residential_Interior	0.00	4,100.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	88.00
tblConstructionPhase	NumDays	5.00	88.00
tblConstructionPhase	PhaseEndDate	5/14/2020	9/1/2020
tblConstructionPhase	PhaseEndDate	5/7/2020	9/1/2020
tblConstructionPhase	PhaseStartDate	5/8/2020	5/1/2020
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	15.00	16.00
tblTripsAndVMT	WorkerTripNumber	1.00	6.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1025	0.7945	0.7748	1.3000e-003	8.6300e-003	0.0429	0.0516	2.3200e-003	0.0406	0.0429	0.0000	113.6158	113.6158	0.0244	0.0000	114.2260
Maximum	**0.1025**	**0.7945**	**0.7748**	**1.3000e-003**	**8.6300e-003**	**0.0429**	**0.0516**	**2.3200e-003**	**0.0406**	**0.0429**	**0.0000**	**113.6158**	**113.6158**	**0.0244**	**0.0000**	**114.2260**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.1025	0.7945	0.7748	1.3000e-003	8.6300e-003	0.0429	0.0516	2.3200e-003	0.0406	0.0429	0.0000	113.6157	113.6157	0.0244	0.0000	114.2259
Maximum	**0.1025**	**0.7945**	**0.7748**	**1.3000e-003**	**8.6300e-003**	**0.0429**	**0.0516**	**2.3200e-003**	**0.0406**	**0.0429**	**0.0000**	**113.6157**	**113.6157**	**0.0244**	**0.0000**	**114.2259**

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

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**5-1-2020**	**7-31-2020**	0.6695	0.6695
2	**8-1-2020**	**9-30-2020**	0.2329	0.2329
		Highest	0.6695	0.6695

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0400e-003	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0400e-003**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	1.0400e-003	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**1.0400e-003**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Outdoor Improvements	Paving	5/1/2020	9/1/2020	5	88	
2	Indoor Improvements	Architectural Coating	5/1/2020	9/1/2020	5	88	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.28

Residential Indoor: 4,100; Residential Outdoor: 1,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Outdoor Improvements	Cement and Mortar Mixers	1	6.00	9	0.56
Outdoor Improvements	Forklifts	1	8.00	89	0.20
Outdoor Improvements	Graders	1	2.00	187	0.41
Outdoor Improvements	Pavers	1	7.00	130	0.42
Outdoor Improvements	Rollers	1	7.00	80	0.38
Outdoor Improvements	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Indoor Improvements	Aerial Lifts	1	8.00	63	0.31
Indoor Improvements	Air Compressors	1	6.00	78	0.48
Indoor Improvements	Concrete/Industrial Saws	1	8.00	81	0.73
Indoor Improvements	Other Construction Equipment	1	4.00	172	0.42

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Outdoor Improvements	6	16.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Indoor Improvements	4	6.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Outdoor Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0397	0.4082	0.3543	5.7000e-004		0.0224	0.0224		0.0207	0.0207	0.0000	49.1145	49.1145	0.0156	0.0000	49.5033
Paving	3.7000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0401**	**0.4082**	**0.3543**	**5.7000e-004**		**0.0224**	**0.0224**		**0.0207**	**0.0207**	**0.0000**	**49.1145**	**49.1145**	**0.0156**	**0.0000**	**49.5033**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0101	2.5500e-003	2.0000e-005	5.2000e-004	5.0000e-005	5.7000e-004	1.5000e-004	5.0000e-005	2.0000e-004	0.0000	2.0849	2.0849	1.3000e-004	0.0000	2.0882
Worker	3.3600e-003	2.4400e-003	0.0245	6.0000e-005	5.5300e-003	5.0000e-005	5.5700e-003	1.4700e-003	4.0000e-005	1.5100e-003	0.0000	5.0897	5.0897	1.9000e-004	0.0000	5.0943

Total	**3.6900e-003**	**0.0125**	**0.0271**	**8.0000e-005**	**6.0500e-003**	**1.0000e-004**	**6.1400e-003**	**1.6200e-003**	**9.0000e-005**	**1.7100e-003**	**0.0000**	**7.1745**	**7.1745**	**3.2000e-004**	**0.0000**	**7.1825**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0397	0.4082	0.3543	5.7000e-004		0.0224	0.0224		0.0207	0.0207	0.0000	49.1144	49.1144	0.0156	0.0000	49.5032
Paving	3.7000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0401**	**0.4082**	**0.3543**	**5.7000e-004**		**0.0224**	**0.0224**		**0.0207**	**0.0207**	**0.0000**	**49.1144**	**49.1144**	**0.0156**	**0.0000**	**49.5032**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0101	2.5500e-003	2.0000e-005	5.2000e-004	5.0000e-005	5.7000e-004	1.5000e-004	5.0000e-005	2.0000e-004	0.0000	2.0849	2.0849	1.3000e-004	0.0000	2.0882
Worker	3.3600e-003	2.4400e-003	0.0245	6.0000e-005	5.5300e-003	5.0000e-005	5.5700e-003	1.4700e-003	4.0000e-005	1.5100e-003	0.0000	5.0897	5.0897	1.9000e-004	0.0000	5.0943
Total	**3.6900e-003**	**0.0125**	**0.0271**	**8.0000e-005**	**6.0500e-003**	**1.0000e-004**	**6.1400e-003**	**1.6200e-003**	**9.0000e-005**	**1.7100e-003**	**0.0000**	**7.1745**	**7.1745**	**3.2000e-004**	**0.0000**	**7.1825**

3.3 Indoor Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0155					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0417	0.3628	0.3816	6.2000e-004		0.0203	0.0203		0.0198	0.0198	0.0000	53.3333	53.3333	8.3300e-003	0.0000	53.5416
Total	**0.0572**	**0.3628**	**0.3816**	**6.2000e-004**		**0.0203**	**0.0203**		**0.0198**	**0.0198**	**0.0000**	**53.3333**	**53.3333**	**8.3300e-003**	**0.0000**	**53.5416**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0101	2.5500e-003	2.0000e-005	5.2000e-004	5.0000e-005	5.7000e-004	1.5000e-004	5.0000e-005	2.0000e-004	0.0000	2.0849	2.0849	1.3000e-004	0.0000	2.0882
Worker	1.2600e-003	9.2000e-004	9.1900e-003	2.0000e-005	2.0700e-003	2.0000e-005	2.0900e-003	5.5000e-004	2.0000e-005	5.7000e-004	0.0000	1.9086	1.9086	7.0000e-005	0.0000	1.9104
Total	**1.5900e-003**	**0.0110**	**0.0117**	**4.0000e-005**	**2.5900e-003**	**7.0000e-005**	**2.6600e-003**	**7.0000e-004**	**7.0000e-005**	**7.7000e-004**	**0.0000**	**3.9935**	**3.9935**	**2.0000e-004**	**0.0000**	**3.9986**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Archit. Coating	0.0155					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0417	0.3628	0.3816	6.2000e-004		0.0203	0.0203		0.0198	0.0198	0.0000	53.3333	53.3333	8.3300e-003	0.0000	53.5416

Total	**0.0572**	**0.3628**	**0.3816**	**6.2000e-004**		**0.0203**	**0.0203**		**0.0198**	**0.0198**	**0.0000**	**53.3333**	**53.3333**	**8.3300e-003**	**0.0000**	**53.5416**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.3000e-004	0.0101	2.5500e-003	2.0000e-005	5.2000e-004	5.0000e-005	5.7000e-004	1.5000e-004	5.0000e-005	2.0000e-004	0.0000	2.0849	2.0849	1.3000e-004	0.0000	2.0882
Worker	1.2600e-003	9.2000e-004	9.1900e-003	2.0000e-005	2.0700e-003	2.0000e-005	2.0900e-003	5.5000e-004	2.0000e-005	5.7000e-004	0.0000	1.9086	1.9086	7.0000e-005	0.0000	1.9104
Total	**1.5900e-003**	**0.0110**	**0.0117**	**4.0000e-005**	**2.5900e-003**	**7.0000e-005**	**2.6600e-003**	**7.0000e-004**	**7.0000e-005**	**7.7000e-004**	**0.0000**	**3.9935**	**3.9935**	**2.0000e-004**	**0.0000**	**3.9986**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.578299	0.039453	0.169996	0.109068	0.028307	0.006716	0.029274	0.026666	0.003071	0.001838	0.005325	0.000874	0.001112

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

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

Mitigated

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

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
	0				

Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	1.0400e-003	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Unmitigated	1.0400e-003	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	7.9000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Total	**1.0400e-003**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	2.5000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	7.9000e-004					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	1.0000e-005	1.0000e-005	0.0000	0.0000	1.0000e-005
Total	**1.0400e-003**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**1.0000e-005**	**1.0000e-005**	**0.0000**	**0.0000**	**1.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

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

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			

Other Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

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

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Fairfield Osborn Preserve Improvements

Sonoma-San Francisco County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 was adjusted based PG&E's reported intensity for 2017 from the PG&E Corporate Responsibility and Sustainability Report (2019)

Land Use - Modeling outdoor improvements and indoor improvements

Construction Phase - Outdoor/indoor improvements modeled assuming construction from 5/1/2020 - 9/1/2020

Off-road Equipment - Indoor improvements include new glass doors/windows, enlarging a restroom, kitchenette remodel, and floor/ceiling improvements

Off-road Equipment - Outdoor improvements consist of paving, pedestrian bridge repair, stone seating

Trips and VMT - Outdoor/indoor improvements assume 8 workers/3 workers and 1 vendor truck/1 vendor truck round trip per day

Architectural Coating - Conservatively assumed whole visitor interior and portion of exterior to be repainted

Vehicle Trips - No additional trips assumed

Consumer Products - No additional consumer products

Area Coating - No additional repainting

Energy Use - No new energy use assumed

Water And Wastewater - No additional water use assumed

Solid Waste - No additional solid waste assumed

Construction Off-road Equipment Mitigation - Water exposed area 2x/day and limit vehicle speed to 15 mph during construction

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Residential_Exterior	0.00	1,000.00
tblArchitecturalCoating	ConstArea_Residential_Interior	0.00	4,100.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	88.00
tblConstructionPhase	NumDays	5.00	88.00
tblConstructionPhase	PhaseEndDate	5/14/2020	9/1/2020
tblConstructionPhase	PhaseEndDate	5/7/2020	9/1/2020
tblConstructionPhase	PhaseStartDate	5/8/2020	5/1/2020
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	15.00	16.00
tblTripsAndVMT	WorkerTripNumber	1.00	6.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	2.3325	18.0446	17.6425	0.0297	0.2051	0.9754	1.1805	0.0549	0.9230	0.9780	0.0000	2,858.6444	2,858.6444	0.6116	0.0000	2,873.9333
Maximum	**2.3325**	**18.0446**	**17.6425**	**0.0297**	**0.2051**	**0.9754**	**1.1805**	**0.0549**	**0.9230**	**0.9780**	**0.0000**	**2,858.6444**	**2,858.6444**	**0.6116**	**0.0000**	**2,873.9333**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	2.3325	18.0446	17.6425	0.0297	0.2051	0.9754	1.1805	0.0549	0.9230	0.9780	0.0000	2,858.6444	2,858.6444	0.6116	0.0000	2,873.9333
Maximum	**2.3325**	**18.0446**	**17.6425**	**0.0297**	**0.2051**	**0.9754**	**1.1805**	**0.0549**	**0.9230**	**0.9780**	**0.0000**	**2,858.6444**	**2,858.6444**	**0.6116**	**0.0000**	**2,873.9333**

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.7200e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**7.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.7200e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**7.0000e-005**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Outdoor Improvements	Paving	5/1/2020	9/1/2020	5	88	
2	Indoor Improvements	Architectural Coating	5/1/2020	9/1/2020	5	88	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.28

Residential Indoor: 4,100; Residential Outdoor: 1,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Outdoor Improvements	Cement and Mortar Mixers	1	6.00	9	0.56
Outdoor Improvements	Forklifts	1	8.00	89	0.20
Outdoor Improvements	Graders	1	2.00	187	0.41
Outdoor Improvements	Pavers	1	7.00	130	0.42
Outdoor Improvements	Rollers	1	7.00	80	0.38
Outdoor Improvements	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Indoor Improvements	Aerial Lifts	1	8.00	63	0.31
Indoor Improvements	Air Compressors	1	6.00	78	0.48
Indoor Improvements	Concrete/Industrial Saws	1	8.00	81	0.73
Indoor Improvements	Other Construction Equipment	1	4.00	172	0.42

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Outdoor Improvements	6	16.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Indoor Improvements	4	6.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Outdoor Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9023	9.2770	8.0527	0.0129		0.5101	0.5101		0.4701	0.4701		1,230.4414	1,230.4414	0.3896		1,240.1821
Paving	8.3400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9107**	**9.2770**	**8.0527**	**0.0129**		**0.5101**	**0.5101**		**0.4701**	**0.4701**		**1,230.4414**	**1,230.4414**	**0.3896**		**1,240.1821**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2400e-003	0.2269	0.0542	5.0000e-004	0.0122	1.1500e-003	0.0133	3.5000e-003	1.1000e-003	4.6000e-003		52.7464	52.7464	3.2200e-003		52.8270
Worker	0.0782	0.0495	0.5877	1.3600e-003	0.1314	1.0200e-003	0.1325	0.0349	9.4000e-004	0.0358		135.6913	135.6913	4.8900e-003		135.8135
Total	**0.0855**	**0.2764**	**0.6419**	**1.8600e-003**	**0.1436**	**2.1700e-003**	**0.1458**	**0.0384**	**2.0400e-003**	**0.0404**		**188.4378**	**188.4378**	**8.1100e-003**		**188.6405**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9023	9.2770	8.0527	0.0129		0.5101	0.5101		0.4701	0.4701	0.0000	1,230.4414	1,230.4414	0.3896		1,240.1821
Paving	8.3400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9107**	**9.2770**	**8.0527**	**0.0129**		**0.5101**	**0.5101**		**0.4701**	**0.4701**	**0.0000**	**1,230.4414**	**1,230.4414**	**0.3896**		**1,240.1821**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2400e-003	0.2269	0.0542	5.0000e-004	0.0122	1.1500e-003	0.0133	3.5000e-003	1.1000e-003	4.6000e-003		52.7464	52.7464	3.2200e-003		52.8270
Worker	0.0782	0.0495	0.5877	1.3600e-003	0.1314	1.0200e-003	0.1325	0.0349	9.4000e-004	0.0358		135.6913	135.6913	4.8900e-003		135.8135
Total	**0.0855**	**0.2764**	**0.6419**	**1.8600e-003**	**0.1436**	**2.1700e-003**	**0.1458**	**0.0384**	**2.0400e-003**	**0.0404**		**188.4378**	**188.4378**	**8.1100e-003**		**188.6405**

3.3 Indoor Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.3528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.9470	8.2457	8.6733	0.0140		0.4616	0.4616		0.4494	0.4494		1,336.1346	1,336.1346	0.2088		1,341.3536
Total	**1.2998**	**8.2457**	**8.6733**	**0.0140**		**0.4616**	**0.4616**		**0.4494**	**0.4494**		**1,336.1346**	**1,336.1346**	**0.2088**		**1,341.3536**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2400e-003	0.2269	0.0542	5.0000e-004	0.0122	1.1500e-003	0.0133	3.5000e-003	1.1000e-003	4.6000e-003		52.7464	52.7464	3.2200e-003		52.8270
Worker	0.0293	0.0186	0.2204	5.1000e-004	0.0493	3.8000e-004	0.0497	0.0131	3.5000e-004	0.0134		50.8843	50.8843	1.8300e-003		50.9301
Total	**0.0366**	**0.2455**	**0.2746**	**1.0100e-003**	**0.0615**	**1.5300e-003**	**0.0630**	**0.0166**	**1.4500e-003**	**0.0180**		**103.6307**	**103.6307**	**5.0500e-003**		**103.7571**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.3528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.9470	8.2457	8.6733	0.0140		0.4616	0.4616		0.4494	0.4494	0.0000	1,336.1346	1,336.1346	0.2088		1,341.3536
Total	**1.2998**	**8.2457**	**8.6733**	**0.0140**		**0.4616**	**0.4616**		**0.4494**	**0.4494**	**0.0000**	**1,336.1346**	**1,336.1346**	**0.2088**		**1,341.3536**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.2400e-003	0.2269	0.0542	5.0000e-004	0.0122	1.1500e-003	0.0133	3.5000e-003	1.1000e-003	4.6000e-003		52.7464	52.7464	3.2200e-003		52.8270
Worker	0.0293	0.0186	0.2204	5.1000e-004	0.0493	3.8000e-004	0.0497	0.0131	3.5000e-004	0.0134		50.8843	50.8843	1.8300e-003		50.9301
Total	**0.0366**	**0.2455**	**0.2746**	**1.0100e-003**	**0.0615**	**1.5300e-003**	**0.0630**	**0.0166**	**1.4500e-003**	**0.0180**		**103.6307**	**103.6307**	**5.0500e-003**		**103.7571**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.578299	0.039453	0.169996	0.109068	0.028307	0.006716	0.029274	0.026666	0.003071	0.001838	0.005325	0.000874	0.001112

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Unmitigated	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Total	**5.7100e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**		**7.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Total	**5.7100e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**		**7.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

Fairfield Osborn Preserve Improvements - Sonoma-San Francisco County, Winter

Fairfield Osborn Preserve Improvements

Sonoma-San Francisco County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Asphalt Surfaces	0.28	Acre	0.28	12,196.80	0

1.2 Other Project Characteristics

Urbanization	Rural	**Wind Speed (m/s)**	2.2	**Precipitation Freq (Days)**	75
Climate Zone	4			**Operational Year**	2021
Utility Company	Pacific Gas & Electric Company				
CO2 Intensity (lb/MWhr)	210	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - CO2 was adjusted based PG&E's reported intensity for 2017 from the PG&E Corporate Responsibility and Sustainability Report (2019)

Land Use - Modeling outdoor improvements and indoor improvements

Construction Phase - Outdoor/indoor improvements modeled assuming construction from 5/1/2020 - 9/1/2020

Off-road Equipment - Indoor improvements include new glass doors/windows, enlarging a restroom, kitchenette remodel, and floor/ceiling improvements

Off-road Equipment - Outdoor improvements consist of paving, pedestrian bridge repair, stone seating

Trips and VMT - Outdoor/indoor improvements assume 8 workers/3 workers and 1 vendor truck/1 vendor truck round trip per day

Architectural Coating - Conservatively assumed whole visitor interior and portion of exterior to be repainted

Vehicle Trips - No additional trips assumed

Consumer Products - No additional consumer products

Area Coating - No additional repainting

Energy Use - No new energy use assumed

Water And Wastewater - No additional water use assumed

Solid Waste - No additional solid waste assumed

Construction Off-road Equipment Mitigation - Water exposed area 2x/day and limit vehicle speed to 15 mph during construction

Table Name	Column Name	Default Value	New Value
tblArchitecturalCoating	ConstArea_Residential_Exterior	0.00	1,000.00
tblArchitecturalCoating	ConstArea_Residential_Interior	0.00	4,100.00
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstructionPhase	NumDays	5.00	88.00
tblConstructionPhase	NumDays	5.00	88.00
tblConstructionPhase	PhaseEndDate	5/14/2020	9/1/2020
tblConstructionPhase	PhaseEndDate	5/7/2020	9/1/2020
tblConstructionPhase	PhaseStartDate	5/8/2020	5/1/2020
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblProjectCharacteristics	CO2IntensityFactor	641.35	210
tblProjectCharacteristics	UrbanizationLevel	Urban	Rural
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	VendorTripNumber	0.00	2.00
tblTripsAndVMT	WorkerTripNumber	15.00	16.00
tblTripsAndVMT	WorkerTripNumber	1.00	6.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	2.3417	18.0653	17.6400	0.0296	0.2051	0.9755	1.1805	0.0549	0.9231	0.9780	0.0000	2,843.0043	2,843.0043	0.6118	0.0000	2,858.3003
Maximum	**2.3417**	**18.0653**	**17.6400**	**0.0296**	**0.2051**	**0.9755**	**1.1805**	**0.0549**	**0.9231**	**0.9780**	**0.0000**	**2,843.0043**	**2,843.0043**	**0.6118**	**0.0000**	**2,858.3003**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	2.3417	18.0653	17.6400	0.0296	0.2051	0.9755	1.1805	0.0549	0.9231	0.9780	0.0000	2,843.0043	2,843.0043	0.6118	0.0000	2,858.3003
Maximum	**2.3417**	**18.0653**	**17.6400**	**0.0296**	**0.2051**	**0.9755**	**1.1805**	**0.0549**	**0.9231**	**0.9780**	**0.0000**	**2,843.0043**	**2,843.0043**	**0.6118**	**0.0000**	**2,858.3003**

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

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.7200e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**7.0000e-005**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**5.7200e-003**	**0.0000**	**3.0000e-005**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**	**0.0000**	**7.0000e-005**

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

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Outdoor Improvements	Paving	5/1/2020	9/1/2020	5	88	
2	Indoor Improvements	Architectural Coating	5/1/2020	9/1/2020	5	88	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0.28

Residential Indoor: 4,100; Residential Outdoor: 1,000; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area:

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Outdoor Improvements	Cement and Mortar Mixers	1	6.00	9	0.56
Outdoor Improvements	Forklifts	1	8.00	89	0.20
Outdoor Improvements	Graders	1	2.00	187	0.41
Outdoor Improvements	Pavers	1	7.00	130	0.42
Outdoor Improvements	Rollers	1	7.00	80	0.38
Outdoor Improvements	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Indoor Improvements	Aerial Lifts	1	8.00	63	0.31
Indoor Improvements	Air Compressors	1	6.00	78	0.48
Indoor Improvements	Concrete/Industrial Saws	1	8.00	81	0.73
Indoor Improvements	Other Construction Equipment	1	4.00	172	0.42

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Outdoor Improvements	6	16.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT
Indoor Improvements	4	6.00	2.00	0.00	10.80	6.60	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Outdoor Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9023	9.2770	8.0527	0.0129		0.5101	0.5101		0.4701	0.4701		1,230.4414	1,230.4414	0.3896		1,240.1821
Paving	8.3400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9107**	**9.2770**	**8.0527**	**0.0129**		**0.5101**	**0.5101**		**0.4701**	**0.4701**		**1,230.4414**	**1,230.4414**	**0.3896**		**1,240.1821**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6400e-003	0.2291	0.0622	4.8000e-004	0.0122	1.1800e-003	0.0134	3.5000e-003	1.1300e-003	4.6300e-003		51.5203	51.5203	3.4900e-003		51.6076
Worker	0.0843	0.0614	0.5743	1.2700e-003	0.1314	1.0200e-003	0.1325	0.0349	9.4000e-004	0.0358		126.1001	126.1001	4.7100e-003		126.2178
Total	**0.0920**	**0.2905**	**0.6365**	**1.7500e-003**	**0.1436**	**2.2000e-003**	**0.1458**	**0.0384**	**2.0700e-003**	**0.0404**		**177.6205**	**177.6205**	**8.2000e-003**		**177.8253**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9023	9.2770	8.0527	0.0129		0.5101	0.5101		0.4701	0.4701	0.0000	1,230.4414	1,230.4414	0.3896		1,240.1821
Paving	8.3400e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**0.9107**	**9.2770**	**8.0527**	**0.0129**		**0.5101**	**0.5101**		**0.4701**	**0.4701**	**0.0000**	**1,230.4414**	**1,230.4414**	**0.3896**		**1,240.1821**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6400e-003	0.2291	0.0622	4.8000e-004	0.0122	1.1800e-003	0.0134	3.5000e-003	1.1300e-003	4.6300e-003		51.5203	51.5203	3.4900e-003		51.6076
Worker	0.0843	0.0614	0.5743	1.2700e-003	0.1314	1.0200e-003	0.1325	0.0349	9.4000e-004	0.0358		126.1001	126.1001	4.7100e-003		126.2178
Total	**0.0920**	**0.2905**	**0.6365**	**1.7500e-003**	**0.1436**	**2.2000e-003**	**0.1458**	**0.0384**	**2.0700e-003**	**0.0404**		**177.6205**	**177.6205**	**8.2000e-003**		**177.8253**

3.3 Indoor Improvements - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.3528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000

Off-Road	0.9470	8.2457	8.6733	0.0140		0.4616	0.4616		0.4494	0.4494		1,336.1346	1,336.1346	0.2088		1,341.3536
Total	**1.2998**	**8.2457**	**8.6733**	**0.0140**		**0.4616**	**0.4616**		**0.4494**	**0.4494**		**1,336.1346**	**1,336.1346**	**0.2088**		**1,341.3536**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6400e-003	0.2291	0.0622	4.8000e-004	0.0122	1.1800e-003	0.0134	3.5000e-003	1.1300e-003	4.6300e-003		51.5203	51.5203	3.4900e-003		51.6076
Worker	0.0316	0.0230	0.2154	4.8000e-004	0.0493	3.8000e-004	0.0497	0.0131	3.5000e-004	0.0134		47.2876	47.2876	1.7600e-003		47.3317
Total	**0.0393**	**0.2522**	**0.2776**	**9.6000e-004**	**0.0615**	**1.5600e-003**	**0.0630**	**0.0166**	**1.4800e-003**	**0.0181**		**98.8079**	**98.8079**	**5.2500e-003**		**98.9392**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Archit. Coating	0.3528					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Off-Road	0.9470	8.2457	8.6733	0.0140		0.4616	0.4616		0.4494	0.4494	0.0000	1,336.1346	1,336.1346	0.2088		1,341.3536
Total	**1.2998**	**8.2457**	**8.6733**	**0.0140**		**0.4616**	**0.4616**		**0.4494**	**0.4494**	**0.0000**	**1,336.1346**	**1,336.1346**	**0.2088**		**1,341.3536**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	7.6400e-003	0.2291	0.0622	4.8000e-004	0.0122	1.1800e-003	0.0134	3.5000e-003	1.1300e-003	4.6300e-003		51.5203	51.5203	3.4900e-003		51.6076
Worker	0.0316	0.0230	0.2154	4.8000e-004	0.0493	3.8000e-004	0.0497	0.0131	3.5000e-004	0.0134		47.2876	47.2876	1.7600e-003		47.3317
Total	**0.0393**	**0.2522**	**0.2776**	**9.6000e-004**	**0.0615**	**1.5600e-003**	**0.0630**	**0.0166**	**1.4800e-003**	**0.0181**		**98.8079**	**98.8079**	**5.2500e-003**		**98.9392**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

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

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Asphalt Surfaces	14.70	6.60	6.60	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Asphalt Surfaces	0.578299	0.039453	0.169996	0.109068	0.028307	0.006716	0.029274	0.026666	0.003071	0.001838	0.005325	0.000874	0.001112

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

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

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e

Land Use	kBTU/yr	lb/day										lb/day					
Other Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

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

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Unmitigated	5.7200e-003	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Total	**5.7100e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**		**7.0000e-005**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	1.3900e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	4.3200e-003					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	0.0000	0.0000	3.0000e-005	0.0000		0.0000	0.0000		0.0000	0.0000		6.0000e-005	6.0000e-005	0.0000		7.0000e-005
Total	**5.7100e-003**	**0.0000**	**3.0000e-005**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**6.0000e-005**	**6.0000e-005**	**0.0000**		**7.0000e-005**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

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

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

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

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

CalEEMod Version: CalEEMod.2016.3.2

Date: 3/4/2020 2:12 PM

Fairfield Osborn Preserve Improvements

Sonoma-San Francisco County, Mitigation Report

Construction Mitigation Summary

Phase	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Percent Reduction												
Indoor Improvements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Outdoor Improvements	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

OFFROAD Equipment Mitigation

Equipment Type	Fuel Type	Tier	Number Mitigated	Total Number of Equipment	DPF	Oxidation Catalyst
Aerial Lifts	Diesel	No Change	0	1	No Change	0.00
Air Compressors	Diesel	No Change	0	1	No Change	0.00
Cement and Mortar Mixers	Diesel	No Change	0	1	No Change	0.00
Concrete/Industrial Saws	Diesel	No Change	0	1	No Change	0.00
Forklifts	Diesel	No Change	0	1	No Change	0.00
Graders	Diesel	No Change	0	1	No Change	0.00
Other Construction Equipment	Diesel	No Change	0	1	No Change	0.00
Pavers	Diesel	No Change	0	1	No Change	0.00
Rollers	Diesel	No Change	0	1	No Change	0.00
Tractors/Loaders/Backhoes	Diesel	No Change	0	1	No Change	0.00

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Unmitigated tons/yr						Unmitigated mt/yr					
Aerial Lifts	1.74000E-003	2.83200E-002	4.81500E-002	7.00000E-005	6.30000E-004	5.80000E-004	0.00000E+000	6.49115E+000	6.49115E+000	2.10000E-003	0.00000E+000	6.54364E+000
Air Compressors	1.06600E-002	7.40900E-002	8.05800E-002	1.30000E-004	4.88000E-003	4.88000E-003	0.00000E+000	1.12343E+001	1.12343E+001	8.70000E-004	0.00000E+000	1.12561E+001
Cement and Mortar Mixers	1.94000E-003	1.21500E-002	1.01800E-002	2.00000E-005	4.70000E-004	4.70000E-004	0.00000E+000	1.51231E+000	1.51231E+000	1.60000E-004	0.00000E+000	1.51624E+000
Concrete/Industrial Saws	1.84000E-002	1.45140E-001	1.62210E-001	2.80000E-004	8.72000E-003	8.72000E-003	0.00000E+000	2.36569E+001	2.36569E+001	1.50000E-003	0.00000E+000	2.36943E+001
Forklifts	6.34000E-003	5.70900E-002	5.19300E-002	7.00000E-005	4.25000E-003	3.91000E-003	0.00000E+000	5.90882E+000	5.90882E+000	1.91000E-003	0.00000E+000	5.95659E+000
Graders	5.23000E-003	6.95800E-002	1.99600E-002	7.00000E-005	2.22000E-003	2.05000E-003	0.00000E+000	6.41371E+000	6.41371E+000	2.07000E-003	0.00000E+000	6.46557E+000
Other Construction Equipment	1.08700E-002	1.15260E-001	9.06900E-002	1.40000E-004	6.08000E-003	5.60000E-003	0.00000E+000	1.19510E+001	1.19510E+001	3.87000E-003	0.00000E+000	1.20476E+001
Pavers	1.01100E-002	1.08200E-001	1.11580E-001	1.80000E-004	5.26000E-003	4.84000E-003	0.00000E+000	1.59011E+001	1.59011E+001	5.14000E-003	0.00000E+000	1.60297E+001
Rollers	8.01000E-003	8.01200E-002	7.29000E-002	1.00000E-004	5.11000E-003	4.70000E-003	0.00000E+000	8.87368E+000	8.87368E+000	2.87000E-003	0.00000E+000	8.94543E+000
Tractors/Loaders/Backhoes	8.07000E-003	8.10500E-002	8.77700E-002	1.20000E-004	5.13000E-003	4.72000E-003	0.00000E+000	1.05048E+001	1.05048E+001	3.40000E-003	0.00000E+000	1.05898E+001

Equipment Type	ROG	NOx	CO	SO2	Exhaust PM10	Exhaust PM2.5	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	Mitigated tons/yr						Mitigated mt/yr					
Aerial Lifts	1.74000E-003	2.83200E-002	4.81500E-002	7.00000E-005	6.30000E-004	5.80000E-004	0.00000E+000	6.49115E+000	6.49115E+000	2.10000E-003	0.00000E+000	6.54363E+000
Air Compressors	1.06600E-002	7.40900E-002	8.05800E-002	1.30000E-004	4.88000E-003	4.88000E-003	0.00000E+000	1.12343E+001	1.12343E+001	8.70000E-004	0.00000E+000	1.12561E+001
Cement and Mortar Mixers	1.94000E-003	1.21500E-002	1.01800E-002	2.00000E-005	4.70000E-004	4.70000E-004	0.00000E+000	1.51231E+000	1.51231E+000	1.60000E-004	0.00000E+000	1.51624E+000
Concrete/Industrial Saws	1.84000E-002	1.45140E-001	1.62210E-001	2.80000E-004	8.72000E-003	8.72000E-003	0.00000E+000	2.36569E+001	2.36569E+001	1.50000E-003	0.00000E+000	2.36943E+001
Forklifts	6.34000E-003	5.70900E-002	5.19300E-002	7.00000E-005	4.25000E-003	3.91000E-003	0.00000E+000	5.90881E+000	5.90881E+000	1.91000E-003	0.00000E+000	5.95659E+000
Graders	5.23000E-003	6.95800E-002	1.99600E-002	7.00000E-005	2.22000E-003	2.05000E-003	0.00000E+000	6.41370E+000	6.41370E+000	2.07000E-003	0.00000E+000	6.46556E+000
Other Construction Equipment	1.08700E-002	1.15260E-001	9.06900E-002	1.40000E-004	6.08000E-003	5.60000E-003	0.00000E+000	1.19510E+001	1.19510E+001	3.87000E-003	0.00000E+000	1.20476E+001
Pavers	1.01100E-002	1.08200E-001	1.11580E-001	1.80000E-004	5.26000E-003	4.84000E-003	0.00000E+000	1.59011E+001	1.59011E+001	5.14000E-003	0.00000E+000	1.60297E+001
Rollers	8.01000E-003	8.01200E-002	7.29000E-002	1.00000E-004	5.11000E-003	4.70000E-003	0.00000E+000	8.87367E+000	8.87367E+000	2.87000E-003	0.00000E+000	8.94542E+000
Tractors/Loaders/Backhoes	8.07000E-003	8.10500E-002	8.77700E-002	1.20000E-004	5.13000E-003	4.72000E-003	0.00000E+000	1.05048E+001	1.05048E+001	3.40000E-003	0.00000E+000	1.05898E+001

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

Percent Reduction												
Aerial Lifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.52820E-006
Air Compressors	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.78026E-006	1.78026E-006	0.00000E+000	0.00000E+000	8.88410E-007
Cement and Mortar Mixers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000
Concrete/Industrial Saws	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.26813E-006	1.26813E-006	0.00000E+000	0.00000E+000	1.26613E-006
Forklifts	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.69239E-006	1.69239E-006	0.00000E+000	0.00000E+000	0.00000E+000
Graders	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.55916E-006	1.55916E-006	0.00000E+000	0.00000E+000	1.54665E-006
Other Construction Equipment	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	8.36752E-007	8.36752E-007	0.00000E+000	0.00000E+000	8.30041E-007
Pavers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.25777E-006	1.25777E-006	0.00000E+000	0.00000E+000	1.24769E-006
Rollers	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.12693E-006	1.12693E-006	0.00000E+000	0.00000E+000	1.11789E-006
Tractors/Loaders/Backhoes	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	0.00000E+000	1.90389E-006	1.90389E-006	0.00000E+000	0.00000E+000	9.44308E-007

Fugitive Dust Mitigation

Yes/No	Mitigation Measure	Mitigation Input		Mitigation Input		Mitigation Input	
No	Soil Stabilizer for unpaved Roads	PM10 Reduction		PM2.5 Reduction			
No	Replace Ground Cover of Area Disturbed	PM10 Reduction		PM2.5 Reduction			
Yes	Water Exposed Area	PM10 Reduction	55.00	PM2.5 Reduction	55.00	Frequency (per day)	2.00
No	Unpaved Road Mitigation	Moisture Content %		Vehicle Speed (mph)	15.00		
No	Clean Paved Road	% PM Reduction	0.00				

		Unmitigated		Mitigated		Percent Reduction	
Phase	Source	PM10	PM2.5	PM10	PM2.5	PM10	PM2.5
Indoor Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00
Indoor Improvements	Roads	0.00	0.00	0.00	0.00	0.00	0.00
Outdoor Improvements	Fugitive Dust	0.00	0.00	0.00	0.00	0.00	0.00

Outdoor Improvements	Roads	0.01	0.00	0.01	0.00	0.00	0.00

Operational Percent Reduction Summary

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

Operational Mobile Mitigation

Project Setting:

Mitigation Selected	Category	Measure	% Reduction	Input Value 1	Input Value 2	Input Value 3
No	Land Use	Increase Density	0.00			
No	Land Use	Increase Diversity	0.00	0.15		
No	Land Use	Improve Walkability Design	0.00			
No	Land Use	Improve Destination Accessibility	0.00			
No	Land Use	Increase Transit Accessibility	0.25			
No	Land Use	Integrate Below Market Rate Housing	0.00			
	Land Use	Land Use SubTotal	0.00			

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

Area Mitigation

Measure Implemented	Mitigation Measure	Input Value
No	Only Natural Gas Hearth	
No	No Hearth	
No	Use Low VOC Cleaning Supplies	
No	Use Low VOC Paint (Residential Interior)	100.00
No	Use Low VOC Paint (Residential Exterior)	150.00
No	Use Low VOC Paint (Non-residential Interior)	100.00
No	Use Low VOC Paint (Non-residential Exterior)	150.00
No	Use Low VOC Paint (Parking)	150.00
No	% Electric Lawnmower	
No	% Electric Leafblower	
No	% Electric Chainsaw	

Energy Mitigation Measures

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

Appliance Type	Land Use Subtype	% Improvement
ClothWasher		30.00
DishWasher		15.00
Fan		50.00
Refrigerator		15.00

Water Mitigation Measures

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

Solid Waste Mitigation

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

Appendix B1

Biological Constraints Report

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February 18, 2020 12340

Kat Marian
Project Manager
Sonoma State University
1801 East Cotati Avenue
Rohnert Park, California 94928-3609

Subject: Results of Biological Resources Constraints Evaluation for the Fairfield Osborn Preserve Visitor Center Improvement Project, Sonoma County, California

Dear Ms. Marian:

This report presents the results of a reconnaissance-level biological resources constraints evaluation conducted by Dudek for proposed improvements to the visitor center at the Fairfield Osborn Preserve (the Preserve) in Sonoma County, California (Figure 1). The Preserve is a 450-acre nature reserve on Sonoma Mountain near Penngrove. The Preserve is managed by the Sonoma State University (SSU) Center for Environmental Inquiry and serves as a teaching, gathering, and an outdoor exploration space that is frequented by students, faculty, visitors, and community members. The Preserve supports the Marjorie Osborn Education and Research Center (visitor center), outdoor support areas, and a trail system that allows access throughout the 450-acre open space area. The proposed project includes renovations to the main visitor center building, construction of two "talking circles," improved pedestrian circulation, parking and emergency access, and improved wayfinding signage on approximately 2.05 acres (the project site).

The purpose of this investigation was to identify and evaluate biological resource issues and potential constraints posed by such resources, including potential permitting and regulatory requirements. This letter report includes the following: (1) a description of the methods used to conduct the evaluation; (2) a brief description of existing habitat conditions on the site; and (3) an analysis of special-status plant and wildlife species and other sensitive biological resources potentially present.

Methods

Dudek searched the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB; CDFW 2020), U.S. Fish and Wildlife Service (USFWS) Inventory for Planning and Consultation (IPaC) database (USFWS 2020), and California Native Plant Society's (CNPS) Inventory of Rare and Endangered Plants data (CNPS Inventory; CNPS 2020) for records of special-status species occurrences in the vicinity of the project site, which included a 300-foot buffer around the project site (hereafter referred to as the Biological Study Area). Additional sources of information included species data and staff observations from the Center of Environmental Inquiry website and personal communications (Marian, K. 2020; SSU 2020). After reviewing the database results, Dudek biologist Ryan Henry visited the site on January 3, 2020 to assess current conditions and evaluate the Biological Study Area's potential to support sensitive natural communities, and special-status plant and wildlife species. For the purposes of this report, sensitive vegetation communities and environmentally sensitive areas are vegetation types, associations, or sub-associations that (1) support concentrations of special-status plant or wildlife species, (2) are relatively limited in distribution, and/or (3) are of particular value to wildlife. The CNDDB provides

an inventory of vegetation types that are collectively considered sensitive local, state, and federal entities. Special-status species are defined as follows:

- Species that are listed, formally proposed, or designated as candidates for listing as threatened or endangered under the federal Endangered Species Act;
- Species that are listed or designated as candidates for listing as rare, threatened, or endangered under the California Endangered Species Act;
- Plant species assigned to California Rare Plant Ranks 1A, 1B, and 2;
- Wildlife species designated as Species of Special Concern or Fully Protected by CDFW;
- Species that meet the definition of rare, threatened, or endangered under Section 15380 of the California Environmental Quality Act guidelines; and/or
- Species that are considered to be a taxon of special concern by local agencies.

The field survey also served to identify potential jurisdictional aquatic resources that occur within the Biological Study Area. Jurisdictional aquatic resources include wetlands, streams, and creeks, among other aquatic features, that are subject to regulation under the federal Clean Water Act (CWA), California Porter-Cologne Water Quality Act (Porter-Cologne), and/or California Fish and Game Code (CFGC).

Existing Conditions

The Biological Study Area encompasses the existing visitor center building, access roads, parking lot, small solar panel array and weather station, and portions of the Preserve's trail system. The Biological Study Area occurs at an elevation that ranges from 1,695 to 1,733 feet above mean sea level, and is located within Sections 23 and 26 of Township 6 North, Range 7 West, of the Glen Ellen California 7.5-minute U.S. Geological Survey quadrangle (Figure 1). A tributary to Copeland Creek bisects the Biological Study Area. A pedestrian bridge provides access over the tributary from the parking lot to the visitor center and trail system. The Biological Study Area is generally characterized by an open, mixed oak forest vegetation community (with associated grasslands) and disturbed land cover (Figure 2). The mixed oak forest is characterized by an overstory of mature coast live oak (*Quercus agrifolia*), California black oak (*Quercus kelloggii*), and valley oak (*Quercus lobata*) trees with some California bay (*Umbellularia californica*). The forest understory and open areas consisted of a mix of shrubs, vines, and herbaceous species, including blue wildrye (*Elymus glaucus*), California blackberry (*Rubus ursinus*), California brome (*Bromus carinatus*), California maidenhair (*Adiantum jordanii*), California swordfern (*Polystichum californicum*), Harding grass (*Phalaris aquatica*), orchardgrass (*Dactylis glomerata*), pennyroyal (*Mentha pulegium*), snowberry (*Symphoricarpos albus*), poison oak (*Toxicodendron diversilobum*), poverty rush (*Juncus tenuis*), tall flatsedge (*Cyperus eragrostis*), western brackenfern (*Pteridium aquilinum*), and wild oat (*Avena fatua*). The disturbed land cover type includes the access roads, parking lots, solar panels, and the visitor center buildings.

Wildlife species detected within the Biological Study Area include the following bird species: bushtit (*Psaltriparus minimus*), California scrub-jay (*Aphelocoma californica*), Hutton's vireo (*Vireo huttoni*), northern mockingbird (*Mimus polyglottos*), oak titmouse (*Baeolophus inornatus*), red-tailed hawk (*Buteo jamaicensis*), and spotted towhee (*Pipilo maculatus*). Mammal species detected within the Biological Study Area include Botta's pocket gopher (*Thomomys bottae*), coyote (*Canis latrans*), and mule deer (*Odocoileus hemionus*). The Biological Study Area also

provides habitat for other wildlife species associated with oak woodlands such as fox squirrel (*Sciurus niger*), northern raccoon (*Procyon lotor*), and striped skunk (*Mephitis mephitis*).

The site visit was conducted during the winter and as a result species detection was limited. However, the Biological Study Area serves as a research facility for SSU and docent-led educational programs for the public. As a result, numerous plant and wildlife inventories have been conducted to identify species within the Preserve and these lists were reviewed for this assessment.

Results

Special-status Plants and Wildlife

Results of the CNDDB, IPaC, and CNPS searches (Appendix A) identified records for 20 special-status plant species and 30 special-status wildlife species within the region of the project site. The data and information provided by the SSU on species detections from staff and the Preserve's visitors was used to help determine the potential for special-status species to occur within the Biological Study Area. A total of 36 species (14 plants and 22 wildlife) were removed from consideration based on a lack of suitable habitat or soil substrates, or because the project site is outside the known geographic or elevation range for the species. Six special-status plants and seven special-statuswildlife have at least a moderate potential to occur within the mixed oak forest vegetation community. Table 1 summarizes these special-status species.

Table 1: Potentially Occurring Special-Status Species

Scientific Name	Common Name	Status (Federal/State/CRPR)
Plants		
Amorpha californica var. napensis	Napa false indigo	None/None/1B.2
Balsamorhiza macrolepis	big-scale balsamroot	None/None/1B.2
Brodiaea leptandra	narrow-anthered brodiaea	None/None/1B.2
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	None/None/1B.2
Navarretia leucocephala ssp. bakeri	Baker's navarretia	None/None/1B.1
Trifolium buckwestiorum	Santa Cruz clover	None/None/1B.1
Wildlife		
Amphibians		
Dicamptodon ensatus	California giant salamander	None/SSC
Rana boylii	foothill yellow-legged frog	None/SSC, PST
Rana draytonii	California red-legged frog	FT/SSC
Birds		
Aquila chrysaetos (nesting & wintering)	golden eagle	BCC/FP, WL
Elanus leucurus (nesting)	white-tailed kite	None/FP
Mammals		
Antrozous pallidus	pallid bat	None/SSC
Corynorhinus townsendii	Townsend's big-eared bat	None/SSC

Status:
Federal
FE – Federally Endangered
FT – State Endangered
BCC – USFWS Bird of Conservation Concern
State
FP – California Fully Protected Species
PST – Proposed State Threatened
SE – State Endangered
ST – State Threatened
SSC – Species of Special Concern
WL – California watch list species
CRPR (California Rare Plant Rank)
1B – Plants rare, threatened, or endangered in California and elsewhere;
(.1) Seriously threatened in California (over 80% of occurrences threatened/high degree and immediacy of threat)
(.2) Moderately threatened in California (20-80% of occurrences threatened/moderate degree and immediacy of threat)

The Biological Study Area does not occur within any USFWS-designated Critical Habitat boundaries for listed plant species. However, the Biological Study Area occurs within USFWS-designated Critical Habitat for the California red-legged frog (Sonoma Mountain, SON-2).

Jurisdictional Waters

One natural drainage, a tributary to Copeland Creek, was investigated as a potential jurisdictional feature within the Biological Study Area. This natural perennial drainage bisects the Biological Study Area and occurs within a portion of the mixed oak forest. The drainage supports a clearly defined ordinary high water mark, as well as connectivity to downstream receiving waters (Copeland Creek, Laguna de Santa Rosa, and Russian River). The entire lateral extent of oak trees (riparian canopy) along the creekbed would be considered (or meets the criteria to be considered) "waters of the State" due to it's physical, hydrological, and biological characteristics. As a result, the channel and riparian canopy of this tributary would be considered a jurisdictional aquatic resource regulated under the CWA, Porter-Cologne, and CFGC (Figure 2). The Biological Study Area is not within the coastal zone as defined by the California Coastal Act.

Other features investigated include two seasonally ponded areas north of the solar panels along the edge of some oaks. These small depressional features contained standing water at the time of the site visit and supported some hydrophytic vegetation (pennyroyal, *Juncus* sp., as well as aquatic invertebrates). These isolated features would likely not constitute federally-regulated features under CWA, but may be considered waters of the State.

Wildlife Movement and Nursery Sites

The Biological Study Area and surrounding environs are largely undeveloped and support a diverse range of vegetation communities and associated wildlife habitats. Although the Biological Study Area is not identified as a regionally significant wildlife corridor (California Wilderness Coalition 2001), it provides local opportunities for wildlife movement. The nearest designated wildlife corridor is Sonoma Creek, which is located approximately 3.8 miles east of the Biological Study Area. The Sonoma Creek corridor is identified as a landscape linkage with a medium priority for conservation by the California Wilderness Coalition (2001).

Local Policies and Ordinances

As a state entity, SSU is not subject to local government planning or ordinances, such as the general plan and ordinances for the County of Sonoma. The following local policies and ordinances pertaining to biological resources are presented for informational purposes.

- County of Sonoma General Plan. Open Space and Resource Conservation Element (County of Sonoma 2008)
    - Biotic Resources, Biotic Habitat Areas – Objective OSRC-7.1 (protect native vegetation and wildlife) and Objective OSRC-7.3 (development guidelines to protect designated biotic habitat areas); Policies OSRC-o (native plant species in landscaping) and OSRC-7p (voluntary programs for habitat restoration/enhancement)
    - Biotic Resources, Riparian Corridors – Policies OSRC-8f (protection of Riparian Corridors) and OSRC-8m (creek setback for streambank erosion)
    - Soil Resources, Soil Erosion – Policy OSRC-11e (retain natural vegetation and topography near waterways)
- County of Sonoma Bennett Valley Area Plan (County of Sonoma 2011)
    - Land Use, Conservation (Resources) – (2) protect environmentally sensitive resources)
    - Land Use, Open Space – (1) protect open vistas; (2) development shall be in harmony with natural surroundings; (3) protect views along scenic corridors
- County of Sonoma Code of Ordinances
    - Tree Protection Ordinance (Chapter 26, Article 88, Sec. 26-88-010) – sets preservation and protection standards for protected trees with a 9-inch or greater diameter at breast height.

Conservation Plans

The Biological Study Area is not located in an area subject to an established habitat conservation or natural communities conservation plan.

Potential Biological Constraints and Recommendations

This section addresses potential biological constraints and impacts associated with implementation of the proposed project. The following biological constraints have been identified for the proposed project: sensitive vegetation communities/environmentally sensitive areas, special-status plant species, special-status wildlife species, migratory and nesting birds, and jurisdictional aquatic resources.

Improvements to the visitor center would result in ground disturbance from grading activities, primarily to the disturbed land cover (access roads, parking lot, and existing buildings). Ground disturbance would result from the following proposed activities:

- Expanding visitor center building (east side) to include a tiered seating area built into the existing hillside;
- Constructing an overhead trellis to the entry courtyard (north side of the building);
- Constructing two "talking circles" to the west of the visitor center building, near the surrounding oak trees, which would include decomposed granite edged with flush weathering steel edging;
- Reconstructing the existing pedestrian bridge that traverses the tributary to Copeland Creek to better accommodate visitors; and
- Expanding the parking lot to meet California Department of Forestry and Fire Protection turnaround requirements as well as provide additional parking spaces. The surface of the parking lot will remain gravel with the exception of paving for handicap accessible spaces.

A small portion of the bridge abutments for the pedestrian bridge would result in minimal ground disturbance to both banks of the tributary within the mixed oak forest vegetation community. Direct temporary and permanent impacts to the mixed oak forest could be significant due to the potential occurrence of special-status species and their habitats, and presence of a potentially jurisdictional stream. Indirect temporary impacts to special-status species and their habitats could also occur during construction activities. Based on these preliminary impact assumptions, the need for additional surveys and analyses to support the proposed project's California Environmental Quality Act (CEQA) documentation, as well as potential opportunities for resource protection, minimization, and mitigation are provided below where appropriate.

- **Sensitive Vegetation Communities/Environmentally Sensitive Areas.** The mixed oak forest vegetation community associated with the tributary drainage to Copeland Creek within the Biological Study Area is a riparian habitat type and is considered sensitive due to its limited distribution and high potential to support threatened and endangered plant and wildlife species. Mixed oak forests are not afforded legal protection unless they support special-status plant or wildlife species. Since this community has the potential to support special-status species (see discussion below); mitigation measures implemented for special-status species are also expected to be protective of this sensitive vegetation community.
- **Special-Status Plants.** Six special-status plant species have at least a moderate potential to occur within the mixed oak forest vegetation community. None of these species have been detected within the Biological Study Area during previous botanical inventories. Dudek recommends conducting a focused survey for special-status plants within the mixed oak forest vegetation community to ensure avoidance of potentially occurring species. The survey should be conducted during each species blooming period to maximize detection. Due to the overlapping blooming periods of these seven special-status plant species, one focused survey should be conducted in April. If these species are found within the construction footprint, mitigation measures should be identified to avoid or minimize impacts. Typically, if special-status plant species are found within construction areas, individual plants or populations would need to be avoided or salvaged/translocated as described in a species-specific mitigation plan.

- **Special-Status Wildlife.** Seven special-status wildlife species have at least a moderate potential to occur within the mixed oak forest, including California giant salamander, foothill yellow-legged frog, California red-legged frog, golden eagle, white-tailed kite, pallid bat, and Townsend's big-eared bat. Of these species, only the California red-legged frog has been detected within the Biological Study Area (Marian 2020). According to the Preserve staff, a total of 13 California red-legged frogs have been found within the parking lot of the Preserve from 2011 to 2019. This species should be assumed present on the project site. The remaining special-status wildlife species were not detected within the Biological Study Area during Dudek's field survey or during previous wildlife inventories. A summary of the potential constraints posed by special-status wildlife and recommendations to reduce potentially significant impacts are provided below.
    - *California giant salamander and foothill yellow-legged frog*. Dudek recommends conducting a preconstruction survey for special-status amphibians prior to any ground-disturbing activities to ensure avoidance of potentially occurring species. If special-status amphibians are detected within the project site, then appropriate mitigation measures should be identified to avoid and minimize impacts. Typically, if special-status amphibian species are found within construction areas, individuals are moved out of harm's way by a qualified biologist.
    - *California red-legged frog*. This species is known to be present on the project site. Additionally, the project site occurs within USFWS-designated Critical Habitat for the species. Any project activities that could potentially result in take of California red-legged frog or loss of habitat would require consultation under Section 7 of the federal Endangered Species Act or incidental take authorization via Section 10 of the federal Endangered Species Act if there is no federal nexus for the project (e.g., federal funding, federal permitting, etc.). Take authorization from the USFWS (via Section 7 or Section 10 of the federal Endangered Species Act, as described above) would be necessary if the proposed project would result in loss of individuals or impacts to habitat for these species. Depending on the type, extent and duration of the proposed impacts, the project would be required to demonstrate avoidance and minimization of impacts, and for any unavoidable impacts provide compensatory mitigation in the form of enhancement and preservation of suitable aquatic and upland habitat either on-site or off-site.

      Consultation under Section 7 of the ESA is often preferred due to the uncertain timeframe associated with negotiating and developing a conservation plan and implementing agreement, and the public review and comment process. The typical federal nexus for this type of Project is acquisition of a CWA Section 404 permit for fill of wetlands or waters of the U.S. Preparation of a Biological Assessment addressing potential impacts, and avoidance and minimization measures to protect the species is necessary to support this process. Potential adverse impacts could be avoided and minimized with incorporation of standard best management practices during construction. Additional conservation measures to protect the species may include establishment of exclusionary fencing and monitoring by a qualified biologist during construction activities.
    - *Pallid bat and Townsend's big-eared bat*. Dudek recommends conducting a preconstruction survey for special-status bat species prior to any ground-disturbing activities to ensure avoidance of potentially occurring species. The preconstruction survey should include a determination on whether active bat roosts are present on or within 50 feet of the project site. If active bat roosts are detected within the project site, then appropriate avoidance and minimization should be incorporated into the project design. Typically, avoiding the bat breeding season when young may be present is accomplished by conducting work from September through March. Additionally, daily

restrictions on the timing of any construction activities should be limited to daylight hours to reduce disturbance to roosting (and foraging) bat species.

- *Golden eagle and white-tailed kite*. Dudek recommends complete avoidance of these fully protected species. Construction activities should be conducted outside of the general nesting season for avian species (typically February through August). If construction occurs during the nesting season, all suitable habitat within a 300-foot buffer of the project site should be thoroughly surveyed by a qualified biologist for the presence of nesting birds before commencement of clearing. If these species are detected, then appropriate site-specific measures must be developed by a qualified biologist in consultation with the CDFW to ensure avoidance.

A formal analysis of potential impacts to special-status wildlife resulting from the proposed project and identification of adequate compensatory mitigation, following the CEQA guidelines, is recommended.

- **Migratory and Nesting Birds.** The Biological Study Area supports potential nesting habitat for both raptors and songbirds due to the presence of trees, shrubs, and other ground cover. Nesting activity typically occurs from February through August. Disturbing or destroying active nests is a violation of the federal Migratory Bird Treaty Act. In addition, nests and eggs are protected under California Fish and Game Code Section 3503. Mitigation for the potential taking of migratory bird species could be accomplished in one of two ways. First, efforts should be made to schedule all vegetation removal activities outside the nesting season to avoid potential impacts to nesting birds. This would ensure that no active nests would be disturbed and that habitat removal could proceed rapidly. Secondly, if initial vegetation removal occurs during the nesting season, all suitable habitat should be thoroughly surveyed by a qualified biologist for the presence of nesting birds before commencement of clearing. If any active nests are detected, a buffer of at least 100 feet (300 feet for raptors) should be delineated, flagged, and avoided until the nesting cycle is complete as determined by a qualified biologist. This measure would ensure avoidance of potentially significant impacts to the golden eagle and white-tailed kite, as well as other special-status birds, if found within the Biological Study Area.
- **Jurisdictional Aquatic Resources.** The project site and Biological Study Area contain jurisdictional areas regulated by the U.S. Army Corps of Engineers (Corps), CDFW, and the Regional Water Quality Control Board (RWQCB). The tributary to Copeland Creek is a perennial drainage that is physically and hydrologically connected to other receiving waters. The creek's channel and lateral extent of the riparian canopy is considered (or meets the criteria to be considered) non-wetland waters of the U.S. and waters of the State. Construction of the proposed pedestrian bridge would impact potentially jurisdictional waters/streambed. This impact would require regulatory permitting authorizations from Corps, CDFW, and RWQCB. In order to determine the extent of jurisdiction and any potential impacts, a formal delineation of waters of the U.S./State is recommended to support the proposed project's CEQA analysis, documentation, and regulatory permitting.

Conclusions

Based on the results of this preliminary assessment, a number of potential biological constraints to the implementation of the project were identified. These constraints include the potential presence of sensitive vegetation communities, special-status plants and wildlife species, potential foraging and nesting habitat for raptors and songbirds, and potential jurisdictional aquatic resources. As a result, Dudek recommends the following project

design features or mitigation measures to avoid, minimize, and mitigate potentially significant impacts to biological resources:

- *Plants*. Conduct one special-status plant survey during the overlapping blooming periods of the target species (April), and if identified, implement measures to protect in-place or mitigate through preparation of a species-specific plant mitigation plan.
- *Special-status amphibians*. Conduct a preconstruction survey for special-status amphibians prior to any ground-disturbing activities to ensure avoidance of potentially occurring species. If special-status amphibians are detected within the project site, then appropriate mitigation measures should be identified to avoid and minimize impacts.
- *California red-legged frog*. Consult with the USFWS under Section 7 of the federal ESA, due to the federal nexus with the Corps and acquisition of a CWA Section 404 permit for fill of wetlands or waters of the U.S. Prepare a Biological Assessment to specifically address potential impacts, and avoidance and minimization measures to the species and designated Critical Habitat.
- *Special-status bats*. Restrict construction activities to daylight hours to ensure no disturbance to foraging bat species occurs. Additionally, conduct a preconstruction roosting bat survey in late April or early May in the season before construction begins.
- *Special-status birds*. Conduct a nesting bird survey just prior to grading if construction activities occur between February and August.
- *Jurisdictional Aquatic Resources*. Conduct a formal delineation of waters of the U.S./State, including wetlands within the Biological Study Area.

Please contact me if you have any questions or require further information.

Sincerely,

Ryan Henry
Senior Biologist

Att.: Figure 1 – Project Location
Figure 2 – Biological Resources

Appendix A – CNDDB, CNPS, and IPaC Database Search Results

References

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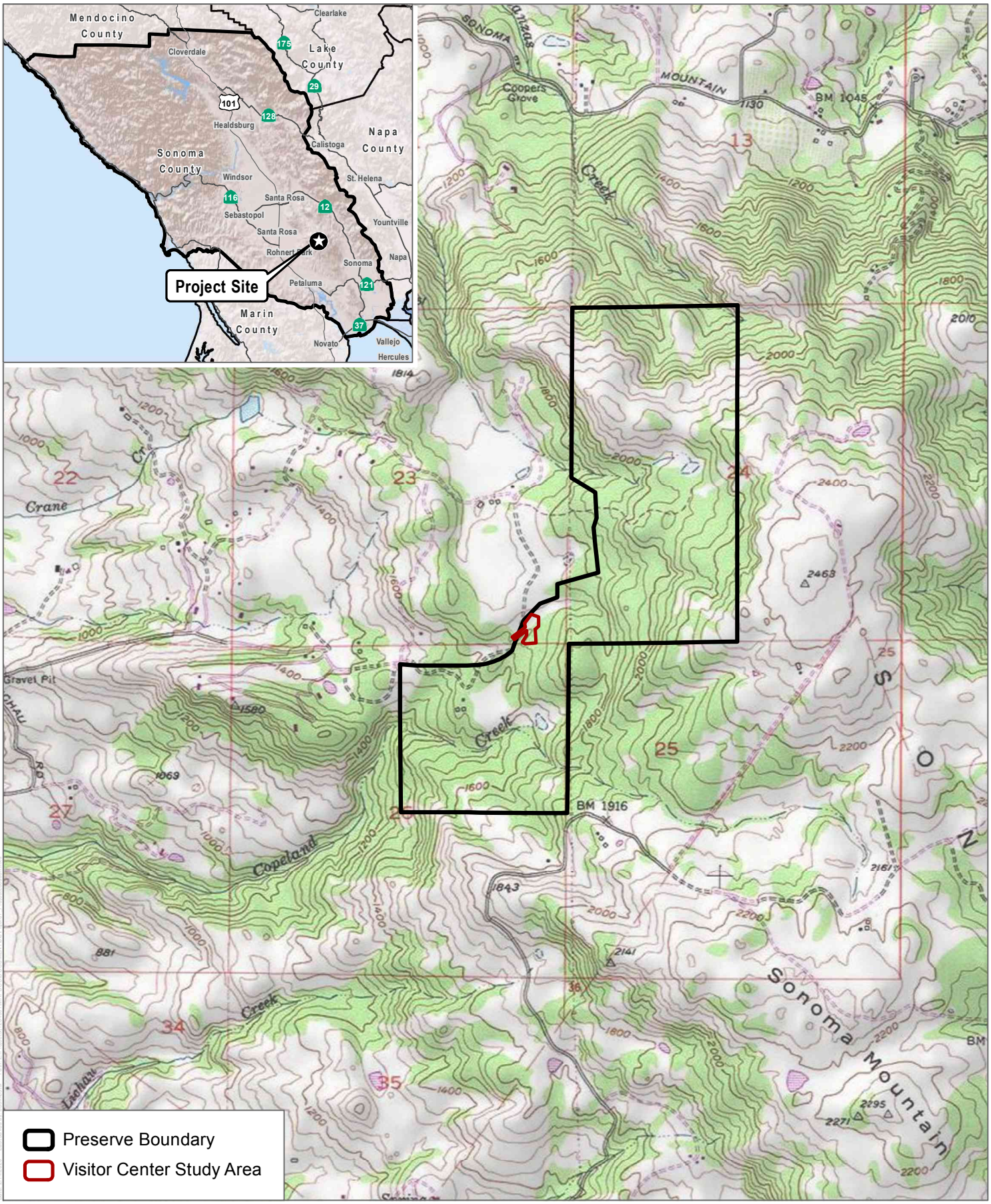


SOURCE: USGS 7.5 Minute Series Glen Ellen Quadrangle

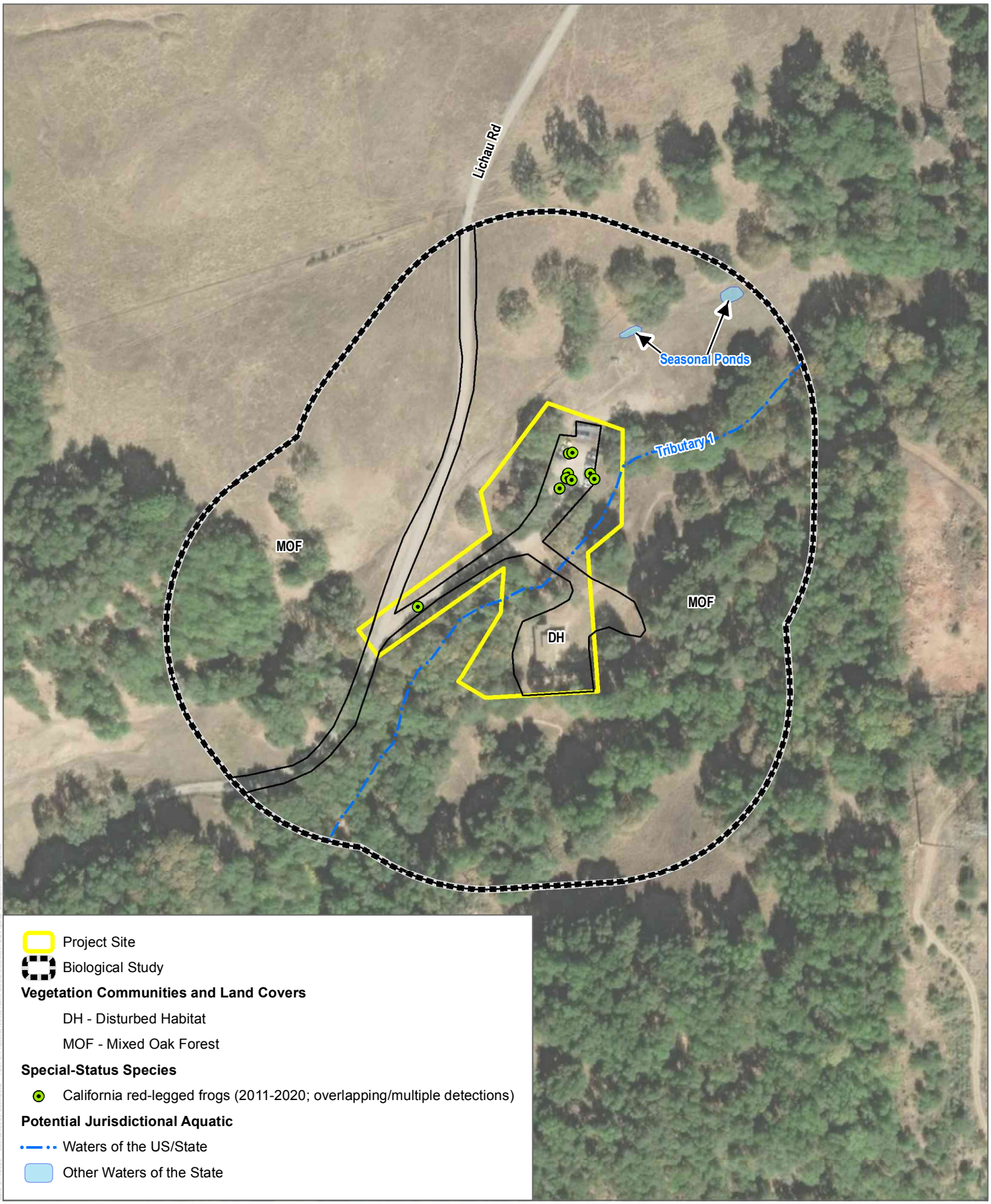
DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Sonoma State Fairfield Osborne Preserve



SOURCE: ESRI 2018, Marian 2020

DUDEK

0 100 200 Feet

FIGURE 2

Biological Resources

Sonoma State Fairfield Osborne Preserve

Appendix A

CNDDB, CNPS, and IPaC Database Search Results

Selected Elements by Scientific Name

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Glen Ellen (3812235) OR Santa Rosa (3812246) OR Kenwood (3812245) OR Rutherford (3812244) OR Cotati (3812236) OR Sonoma (3812234) OR Petaluma (3812226) OR Petaluma River (3812225) OR Sears Point (3812224))

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Accipiter cooperii Cooper's hawk	ABNKC12040	None	None	G5	S4	WL
Adela oplerella Opler's longhorn moth	IILEE0G040	None	None	G2	S2	
Agelaius tricolor tricolored blackbird	ABPBXB0020	None	Threatened	G2G3	S1S2	SSC
Allium peninsulare var. franciscanum Franciscan onion	PMLIL021R1	None	None	G5T2	S2	1B.2
Alopecurus aequalis var. sonomensis Sonoma alopecurus	PMPOA07012	Endangered	None	G5T1	S1	1B.1
Ambystoma californiense California tiger salamander	AAAAA01180	Threatened	Threatened	G2G3	S2S3	WL
Ammodramus savannarum grasshopper sparrow	ABPBXA0020	None	None	G5	S3	SSC
Amorpha californica var. napensis Napa false indigo	PDFAB08012	None	None	G4T2	S2	1B.2
Amsinckia lunaris bent-flowered fiddleneck	PDBOR01070	None	None	G3	S3	1B.2
Andrena blennospermatis Blennosperma vernal pool andrenid bee	IIHYM35030	None	None	G2	S2	
Antrozous pallidus pallid bat	AMACC10010	None	None	G5	S3	SSC
Aquila chrysaetos golden eagle	ABNKC22010	None	None	G5	S3	FP
Arctostaphylos stanfordiana ssp. decumbens Rincon Ridge manzanita	PDERI041G4	None	None	G3T1	S1	1B.1
Astragalus claranus Clara Hunt's milk-vetch	PDFAB0F240	Endangered	Threatened	G1	S1	1B.1
Astragalus tener var. tener alkali milk-vetch	PDFAB0F8R1	None	None	G2T1	S1	1B.2
Athene cunicularia burrowing owl	ABNSB10010	None	None	G4	S3	SSC
Balsamorhiza macrolepis big-scale balsamroot	PDAST11061	None	None	G2	S2	1B.2
Blennosperma bakeri Sonoma sunshine	PDAST1A010	Endangered	Endangered	G1	S1	1B.1
Bombus caliginosus obscure bumble bee	IIHYM24380	None	None	G4?	S1S2	

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Bombus crotchii Crotch bumble bee	IIHYM24480	None	Candidate Endangered	G3G4	S1S2	
Bombus occidentalis western bumble bee	IIHYM24250	None	Candidate Endangered	G2G3	S1	
Brodiaea leptandra narrow-anthered brodiaea	PMLIL0C022	None	None	G3?	S3?	1B.2
Buteo regalis ferruginous hawk	ABNKC19120	None	None	G4	S3S4	WL
Buteo swainsoni Swainson's hawk	ABNKC19070	None	Threatened	G5	S3	
Caecidotea tomalensis Tomales isopod	ICMAL01220	None	None	G2	S2S3	
Calicina diminua Marin blind harvestman	ILARAU8040	None	None	G1	S1	
Ceanothus confusus Rincon Ridge ceanothus	PDRHA04220	None	None	G1	S1	1B.1
Ceanothus divergens Calistoga ceanothus	PDRHA04240	None	None	G2	S2	1B.2
Ceanothus masonii Mason's ceanothus	PDRHA04200	None	Rare	G1	S1	1B.2
Ceanothus purpureus holly-leaved ceanothus	PDRHA04160	None	None	G2	S2	1B.2
Ceanothus sonomensis Sonoma ceanothus	PDRHA04420	None	None	G2	S2	1B.2
Centromadia parryi ssp. parryi pappose tarplant	PDAST4R0P2	None	None	G3T2	S2	1B.2
Chloropyron maritimum ssp. palustre Point Reyes salty bird's-beak	PDSCR0J0C3	None	None	G4?T2	S2	1B.2
Chloropyron molle ssp. molle soft salty bird's-beak	PDSCR0J0D2	Endangered	Rare	G2T1	S1	1B.2
Chorizanthe valida Sonoma spineflower	PDPGN040V0	Endangered	Endangered	G1	S1	1B.1
Coastal Brackish Marsh Coastal Brackish Marsh	CTT52200CA	None	None	G2	S2.1	
Coccyzus americanus occidentalis western yellow-billed cuckoo	ABNRB02022	Threatened	Endangered	G5T2T3	S1	
Corynorhinus townsendii Townsend's big-eared bat	AMACC08010	None	None	G3G4	S2	SSC
Coturnicops noveboracensis yellow rail	ABNME01010	None	None	G4	S1S2	SSC
Cypseloides niger black swift	ABNUA01010	None	None	G4	S2	SSC

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Danaus plexippus pop. 1 monarch - California overwintering population	IILEPP2012	None	None	G4T2T3	S2S3	
Delphinium bakeri Baker's larkspur	PDRAN0B050	Endangered	Endangered	G1	S1	1B.1
Delphinium luteum golden larkspur	PDRAN0B0Z0	Endangered	Rare	G1	S1	1B.1
Dicamptodon ensatus California giant salamander	AAAAH01020	None	None	G3	S2S3	SSC
Downingia pusilla dwarf downingia	PDCAM060C0	None	None	GU	S2	2B.2
Elanus leucurus white-tailed kite	ABNKC06010	None	None	G5	S3S4	FP
Emys marmorata western pond turtle	ARAAD02030	None	None	G3G4	S3	SSC
Eremophila alpestris actia California horned lark	ABPAT02011	None	None	G5T4Q	S4	WL
Erethizon dorsatum North American porcupine	AMAFJ01010	None	None	G5	S3	
Erigeron greenei Greene's narrow-leaved daisy	PDAST3M5G0	None	None	G3	S3	1B.2
Eriogonum luteolum var. caninum Tiburon buckwheat	PDPGN083S1	None	None	G5T2	S2	1B.2
Eryngium jepsonii Jepson's coyote-thistle	PDAPI0Z130	None	None	G2	S2	1B.2
Fritillaria liliacea fragrant fritillary	PMLIL0V0C0	None	None	G2	S2	1B.2
Geothlypis trichas sinuosa saltmarsh common yellowthroat	ABPBX1201A	None	None	G5T3	S3	SSC
Haliaeetus leucocephalus bald eagle	ABNKC10010	Delisted	Endangered	G5	S3	FP
Hemizonia congesta ssp. congesta congested-headed hayfield tarplant	PDAST4R065	None	None	G5T2	S2	1B.2
Hesperolinon congestum Marin western flax	PDLIN01060	Threatened	Threatened	G1	S1	1B.1
Horkelia tenuiloba thin-lobed horkelia	PDROS0W0E0	None	None	G2	S2	1B.2
Hydrochara rickseckeri Ricksecker's water scavenger beetle	IICOL5V010	None	None	G2?	S2?	
Hydroporus leechi Leech's skyline diving beetle	IICOL55040	None	None	G1?	S1?	
Lasthenia burkei Burke's goldfields	PDAST5L010	Endangered	Endangered	G1	S1	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Lasthenia conjugens Contra Costa goldfields	PDAST5L040	Endangered	None	G1	S1	1B.1
Laterallus jamaicensis coturniculus California black rail	ABNME03041	None	Threatened	G3G4T1	S1	FP
Layia septentrionalis Colusa layia	PDAST5N0F0	None	None	G2	S2	1B.2
Legenere limosa legenere	PDCAM0C010	None	None	G2	S2	1B.1
Leptosiphon jepsonii Jepson's leptosiphon	PDPLM09140	None	None	G2G3	S2S3	1B.2
Lilium pardalinum ssp. pitkinense Pitkin Marsh lily	PMLIL1A0H3	Endangered	Endangered	G5T1	S1	1B.1
Limnanthes vinculans Sebastopol meadowfoam	PDLIM02090	Endangered	Endangered	G1	S1	1B.1
Linderiella occidentalis California linderiella	ICBRA06010	None	None	G2G3	S2S3	
Lupinus sericatus Cobb Mountain lupine	PDFAB2B3J0	None	None	G2?	S2?	1B.2
Melospiza melodia samuelis San Pablo song sparrow	ABPBXA301W	None	None	G5T2	S2	SSC
Microseris paludosa marsh microseris	PDAST6E0D0	None	None	G2	S2	1B.2
Myotis thysanodes fringed myotis	AMACC01090	None	None	G4	S3	
Myotis volans long-legged myotis	AMACC01110	None	None	G5	S3	
Myotis yumanensis Yuma myotis	AMACC01020	None	None	G5	S4	
Navarretia leucocephala ssp. bakeri Baker's navarretia	PDPLM0C0E1	None	None	G4T2	S2	1B.1
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	CTT52110CA	None	None	G3	S3.2	
Northern Vernal Pool Northern Vernal Pool	CTT44100CA	None	None	G2	S2.1	
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	AFCHA0209G	Threatened	None	G5T2T3Q	S2S3	
Penstemon newberryi var. sonomensis Sonoma beardtongue	PDSCR1L483	None	None	G4T2	S2	1B.3
Plagiobothrys mollis var. vestitus Petaluma popcornflower	PDBOR0V0Q2	None	None	G4?TX	SX	1A
Pleuropogon hooverianus North Coast semaphore grass	PMPOA4Y070	None	Threatened	G2	S2	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Pogonichthys macrolepidotus Sacramento splittail	AFCJB34020	None	None	GNR	S3	SSC
Polygonum marinense Marin knotweed	PDPGN0L1C0	None	None	G2Q	S2	3.1
Rallus obsoletus obsoletus California Ridgway's rail	ABNME05011	Endangered	Endangered	G5T1	S1	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	
Sidalcea calycosa ssp. rhizomata Point Reyes checkerbloom	PDMAL11012	None	None	G5T2	S2	1B.2
Sidalcea oregana ssp. valida Kenwood Marsh checkerbloom	PDMAL110K5	Endangered	Endangered	G5T1	S1	1B.1
Sorex ornatus sinuosus Suisun shrew	AMABA01103	None	None	G5T1T2Q	S1S2	SSC
Speyeria zerene sonomensis Sonoma zerene fritillary	IILEPJ6083	None	None	G5T1	S1	
Spirinchus thaleichthys longfin smelt	AFCHB03010	Candidate	Threatened	G5	S1	
Streptanthus hesperidis green jewelflower	PDBRA2G510	None	None	G2	S2	1B.2
Syncaris pacifica California freshwater shrimp	ICMAL27010	Endangered	Endangered	G2	S2	
Talanites ubicki Ubick's gnaphosid spider	ILARA98030	None	None	G1	S1	
Taricha rivularis red-bellied newt	AAAAF02020	None	None	G4	S2	SSC
Taxidea taxus American badger	AMAJF04010	None	None	G5	S3	SSC
Trifolium amoenum two-fork clover	PDFAB40040	Endangered	None	G1	S1	1B.1
Trifolium buckwestiorum Santa Cruz clover	PDFAB402W0	None	None	G2	S2	1B.1
Trifolium hydrophilum saline clover	PDFAB400R5	None	None	G2	S2	1B.2
Trifolium polyodon Pacific Grove clover	PDFAB402H0	None	Rare	G1	S1	1B.1

Species	Element Code	Federal Status	State Status	Global Rank	State Rank	Rare Plant Rank/CDFW SSC or FP
Triquetrella californica	NBMUS7S010	None	None	G2	S2	1B.2
coastal triquetrella						
Tryonia imitator	IMGASJ7040	None	None	G2	S2	
mimic tryonia (=California brackishwater snail)						
Valley Needlegrass Grassland	CTT42110CA	None	None	G3	S3.1	
Valley Needlegrass Grassland						
Viburnum ellipticum	PDCPR07080	None	None	G4G5	S3?	2B.3
oval-leaved viburnum						

Record Count: 107

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

76 matches found. *Click on scientific name for details*

Search Criteria

Found in Quads 3812246, 3812245, 3812244, 3812236, 3812235, 3812234, 3812226 3812225 and 3812224;

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	State Listing Status	Federal Listing Status	Habitats	Lowest Elevation	Highest Elevation	CA Endemic
Allium peninsulare var. franciscanum	Franciscan onion	Alliaceae	perennial bulbiferous herb	(Apr)May-Jun	1B.2	S2	G5T2			• Cismontane woodland • Valley and foothill grassland	52 m	305 m	yes
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	Poaceae	perennial herb	May-Jul	1B.1	S1	G5T1		FE	• Marshes and swamps (freshwater) • Riparian scrub	5 m	365 m	yes
Amorpha californica var. napensis	Napa false indigo	Fabaceae	perennial deciduous shrub	Apr-Jul	1B.2	S2	G4T2			• Broadleafed upland forest (openings) • Chaparral • Cismontane woodland	120 m	2000 m	yes
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S3	G3			• Coastal bluff scrub • Cismontane woodland • Valley and foothill grassland	3 m	500 m	yes
Antirrhinum virga	twig-like snapdragon	Plantaginaceae	perennial herb	Jun-Jul	4.3	S3?	G3?			• Chaparral • Lower montane coniferous forest	100 m	2015 m	yes
Arctostaphylos bakeri ssp. bakeri	Baker's manzanita	Ericaceae	perennial evergreen shrub	Feb-Apr	1B.1	S1	G2T1	CR		• Broadleafed upland forest • Chaparral	75 m	300 m	yes
Arctostaphylos stanfordiana ssp. decumbens	Rincon Ridge manzanita	Ericaceae	perennial evergreen shrub	Feb-Apr(May)	1B.1	S1	G3T1			• Chaparral (rhyolitic) • Cismontane woodland	75 m	370 m	yes
Astragalus claranus	Clara Hunt's milk-vetch	Fabaceae	annual herb	Mar-May	1B.1	S1	G1	CT	FE	• Chaparral (openings) •	75 m	275 m	yes

									Cismontane woodland • Valley and foothill grassland			
Astragalus tener var. tener	alkali milk-vetch	Fabaceae	annual herb	Mar-Jun	1B.2	S1	G2T1		• Playas • Valley and foothill grassland (adobe clay) • Vernal pools	1 m	60 m	yes
Balsamorhiza macrolepis	big-scale balsamroot	Asteraceae	perennial herb	Mar-Jun	1B.2	S2	G2		• Chaparral • Cismontane woodland • Valley and foothill grassland	45 m	1555 m	yes
Blennosperma bakeri	Sonoma sunshine	Asteraceae	annual herb	Mar-May	1B.1	S1	G1	CE FE	• Valley and foothill grassland (mesic) • Vernal pools	10 m	110 m	yes
Brodiaea leptandra	narrow-anthered brodiaea	Themidaceae	perennial bulbiferous herb	May-Jul	1B.2	S3?	G3?		• Broadleafed upland forest • Chaparral • Cismontane woodland • Lower montane coniferous forest • Valley and foothill grassland	110 m	915 m	yes
Calamagrostis ophitidis	serpentine reed grass	Poaceae	perennial herb	Apr-Jul	4.3	S3	G3		• Chaparral (open, often north-facing slopes) • Lower montane coniferous forest • Meadows and seeps • Valley and foothill grassland	90 m	1065 m	yes
Calandrinia breweri	Brewer's calandrinia	Montiaceae	annual herb	(Jan)Mar-Jun	4.2	S4	G4		• Chaparral • Coastal scrub	10 m	1220 m	
Calochortus uniflorus	pink star-tulip	Liliaceae	perennial bulbiferous herb	Apr-Jun	4.2	S4	G4		• Coastal prairie • Coastal scrub • Meadows and seeps • North Coast coniferous forest	10 m	1070 m	
Castilleja ambigua var. ambigua	johnny-nip	Orobanchaceae	annual herb (hemiparasitic)	Mar-Aug	4.2	S3S4	G4T4		• Coastal bluff scrub • Coastal prairie • Coastal scrub • Marshes and swamps • Valley and foothill grassland	0 m	435 m	

										• Vernal pools margins			
Ceanothus confusus	Rincon Ridge ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Jun	1B.1	S1	G1			• Closed-cone coniferous forest • Chaparral • Cismontane woodland	75 m	1065 m	yes
Ceanothus divergens	Calistoga ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr	1B.2	S2	G2			• Chaparral (serpentinite or volcanic, rocky)	170 m	950 m	yes
Ceanothus gloriosus var. exaltatus	glory brush	Rhamnaceae	perennial evergreen shrub	Mar-Jun(Aug)	4.3	S4	G4T4			• Chaparral	30 m	610 m	yes
Ceanothus masonii	Mason's ceanothus	Rhamnaceae	perennial evergreen shrub	Mar-Apr	1B.2	S1	G1	CR		• Chaparral (openings, rocky, serpentinite)	230 m	500 m	yes
Ceanothus purpureus	holly-leaved ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Jun	1B.2	S2	G2			• Chaparral • Cismontane woodland	120 m	640 m	yes
Ceanothus sonomensis	Sonoma ceanothus	Rhamnaceae	perennial evergreen shrub	Feb-Apr	1B.2	S2	G2			• Chaparral (sandy, serpentinite or volcanic)	215 m	800 m	yes
Centromadia parryi ssp. parryi	pappose tarplant	Asteraceae	annual herb	May-Nov	1B.2	S2	G3T2			• Chaparral • Coastal prairie • Meadows and seeps • Marshes and swamps (coastal salt) • Valley and foothill grassland (vernally mesic)	0 m	420 m	yes
Chloropyron maritimum ssp. palustre	Point Reyes bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Oct	1B.2	S2	G4?T2			• Marshes and swamps (coastal salt)	0 m	10 m	
Chloropyron molle ssp. molle	soft bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jun-Nov	1B.2	S1	G2T1	CR	FE	• Marshes and swamps (coastal salt)	0 m	3 m	yes
Chorizanthe valida	Sonoma spineflower	Polygonaceae	annual herb	Jun-Aug	1B.1	S1	G1	CE	FE	• Coastal prairie (sandy)	10 m	305 m	yes
Clarkia breweri	Brewer's clarkia	Onagraceae	annual herb	Apr-Jun	4.2	S4	G4			• Chaparral • Cismontane woodland • Coastal scrub	215 m	1115 m	yes
Cordylanthus tenuis ssp. brunneus	serpentine bird's-beak	Orobanchaceae	annual herb (hemiparasitic)	Jul-Aug	4.3	S3	G4G5T3			• Closed-cone coniferous forest • Chaparral • Cismontane woodland	305 m	915 m	yes
Delphinium bakeri	Baker's larkspur	Ranunculaceae	perennial herb	Mar-May	1B.1	S1	G1	CE	FE	• Broadleafed	80 m	305 m	yes

										upland forest • Coastal scrub • Valley and foothill grassland			
Delphinium luteum	golden larkspur	Ranunculaceae	perennial herb	Mar-May	1B.1	S1	G1	CR	FE	• Chaparral • Coastal prairie • Coastal scrub	0 m	100 m	yes
Downingia pusilla	dwarf downingia	Campanulaceae	annual herb	Mar-May	2B.2	S2	GU			• Valley and foothill grassland (mesic) • Vernal pools	1 m	445 m	
Eleocharis parvula	small spikerush	Cyperaceae	perennial herb	(Apr)Jun-Aug(Sep)	4.3	S3	G5			• Marshes and swamps	1 m	3020 m	
Erigeron biolettii	streamside daisy	Asteraceae	perennial herb	Jun-Oct	3	S3?	G3?			• Broadleafed upland forest • Cismontane woodland • North Coast coniferous forest	30 m	1100 m	yes
Erigeron greenei	Greene's narrow-leaved daisy	Asteraceae	perennial herb	May-Sep	1B.2	S3	G3			• Chaparral (serpentinite or volcanic)	80 m	1005 m	yes
Eriogonum luteolum var. caninum	Tiburon buckwheat	Polygonaceae	annual herb	May-Sep	1B.2	S2	G5T2			• Chaparral • Cismontane woodland • Coastal prairie • Valley and foothill grassland	0 m	700 m	yes
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2			• Cismontane woodland • Coastal prairie • Coastal scrub • Valley and foothill grassland	3 m	410 m	yes
Hemizonia congesta ssp. congesta	congested-headed hayfield tarplant	Asteraceae	annual herb	Apr-Nov	1B.2	S2	G5T2			• Valley and foothill grassland	20 m	560 m	yes
Hesperolinon congestum	Marin western flax	Linaceae	annual herb	Apr-Jul	1B.1	S1	G1	CT	FT	• Chaparral • Valley and foothill grassland	5 m	370 m	yes
Horkelia tenuiloba	thin-lobed horkelia	Rosaceae	perennial herb	May-Jul(Aug)	1B.2	S2	G2			• Broadleafed upland forest • Chaparral • Valley and foothill grassland	50 m	500 m	yes
Iris longipetala	coast iris	Iridaceae	perennial rhizomatous herb	Mar-May	4.2	S3	G3			• Coastal prairie • Lower montane coniferous forest	0 m	600 m	yes

										• Meadows and seeps			
Lasthenia burkei	Burke's goldfields	Asteraceae	annual herb	Apr-Jun	1B.1	S1	G1	CE	FE	• Meadows and seeps (mesic) • Vernal pools	15 m	600 m	yes
Lasthenia conjugens	Contra Costa goldfields	Asteraceae	annual herb	Mar-Jun	1B.1	S1	G1		FE	• Cismontane woodland • Playas (alkaline) • Valley and foothill grassland • Vernal pools	0 m	470 m	yes
Layia septentrionalis	Colusa layia	Asteraceae	annual herb	Apr-May	1B.2	S2	G2			• Chaparral • Cismontane woodland • Valley and foothill grassland	100 m	1095 m	yes
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2			• Vernal pools	1 m	880 m	yes
Leptosiphon acicularis	bristly leptosiphon	Polemoniaceae	annual herb	Apr-Jul	4.2	S4?	G4?			• Chaparral • Cismontane woodland • Coastal prairie • Valley and foothill grassland	55 m	1500 m	yes
Leptosiphon jepsonii	Jepson's leptosiphon	Polemoniaceae	annual herb	Mar-May	1B.2	S2S3	G2G3			• Chaparral • Cismontane woodland • Valley and foothill grassland	100 m	500 m	yes
Lessingia hololeuca	woolly-headed lessingia	Asteraceae	annual herb	Jun-Oct	3	S2S3	G3?			• Broadleafed upland forest • Coastal scrub • Lower montane coniferous forest • Valley and foothill grassland	15 m	305 m	yes
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	Liliaceae	perennial bulbiferous herb	Jun-Jul	1B.1	S1	G5T1	CE	FE	• Cismontane woodland • Meadows and seeps • Marshes and swamps (freshwater)	35 m	65 m	yes
Lilium rubescens	redwood lily	Liliaceae	perennial bulbiferous herb	Apr-Aug(Sep)	4.2	S3	G3			• Broadleafed upland forest • Chaparral • Lower montane coniferous forest • North Coast coniferous forest	30 m	1910 m	yes

										• Upper montane coniferous forest			
Limnanthes vinculans	Sebastopol meadowfoam	Limnanthaceae	annual herb	Apr-May	1B.1	S1	G1	CE	FE	• Meadows and seeps • Valley and foothill grassland • Vernal pools	15 m	305 m	yes
Lomatium repostum	Napa lomatium	Apiaceae	perennial herb	Mar-Jun	4.3	S3	G3			• Chaparral • Cismontane woodland	90 m	830 m	yes
Lupinus sericatus	Cobb Mountain lupine	Fabaceae	perennial herb	Mar-Jun	1B.2	S2?	G2?			• Broadleafed upland forest • Chaparral • Cismontane woodland • Lower montane coniferous forest	275 m	1525 m	yes
Micropus amphibolus	Mt. Diablo cottonweed	Asteraceae	annual herb	Mar-May	3.2	S3S4	G3G4			• Broadleafed upland forest • Chaparral • Cismontane woodland • Valley and foothill grassland	45 m	825 m	yes
Microseris paludosa	marsh microseris	Asteraceae	perennial herb	Apr-Jun(Jul)	1B.2	S2	G2			• Closed-cone coniferous forest • Cismontane woodland • Coastal scrub • Valley and foothill grassland	5 m	355 m	yes
Monardella viridis	green monardella	Lamiaceae	perennial rhizomatous herb	Jun-Sep	4.3	S3	G3			• Broadleafed upland forest • Chaparral • Cismontane woodland	100 m	1010 m	yes
Navarretia cotulifolia	cotula navarretia	Polemoniaceae	annual herb	May-Jun	4.2	S4	G4			• Chaparral • Cismontane woodland • Valley and foothill grassland	4 m	1830 m	yes
Navarretia heterandra	Tehama navarretia	Polemoniaceae	annual herb	Apr-Jun	4.3	S4	G4			• Valley and foothill grassland (mesic) • Vernal pools	30 m	1010 m	
Navarretia leucocephala ssp. bakeri	Baker's navarretia	Polemoniaceae	annual herb	Apr-Jul	1B.1	S2	G4T2			• Cismontane woodland • Lower montane coniferous	5 m	1740 m	yes

										forest • Meadows and seeps • Valley and foothill grassland • Vernal pools			
Navarretia leucocephala ssp. plieantha	many-flowered navarretia	Polemoniaceae	annual herb	May-Jun	1B.2	S1	G4T1	CE	FE	• Vernal pools (volcanic ash flow)	30 m	950 m	yes
Penstemon newberryi var. sonomensis	Sonoma beardtongue	Plantaginaceae	perennial herb	Apr-Aug	1B.3	S2	G4T2			• Chaparral (rocky)	700 m	1370 m	yes
Plagiobothrys mollis var. vestitus	Petaluma popcornflower	Boraginaceae	perennial herb	Jun-Jul	1A	SX	G4?TX			• Marshes and swamps (coastal salt) • Valley and foothill grassland (mesic)	10 m	50 m	yes
Pleuropogon hooverianus	North Coast semaphore grass	Poaceae	perennial rhizomatous herb	Apr-Jun	1B.1	S2	G2	CT		• Broadleafed upland forest • Meadows and seeps • North Coast coniferous forest	10 m	671 m	yes
Pleuropogon refractus	nodding semaphore grass	Poaceae	perennial rhizomatous herb	(Mar)Apr-Aug	4.2	S4	G4			• Lower montane coniferous forest • Meadows and seeps • North Coast coniferous forest • Riparian forest	0 m	1600 m	
Polygonum marinense	Marin knotweed	Polygonaceae	annual herb	(Apr)May-Aug(Oct)	3.1	S2	G2Q			• Marshes and swamps (coastal salt or brackish)	0 m	10 m	yes
Ranunculus lobbii	Lobb's aquatic buttercup	Ranunculaceae	annual herb (aquatic)	Feb-May	4.2	S3	G4			• Cismontane woodland • North Coast coniferous forest • Valley and foothill grassland • Vernal pools	15 m	470 m	
Rhynchospora globularis	round-headed beaked-rush	Cyperaceae	perennial rhizomatous herb	Jul-Aug	2B.1	S1	G4			• Marshes and swamps (freshwater)	45 m	60 m	
Sidalcea calycosa ssp. rhizomata	Point Reyes checkerbloom	Malvaceae	perennial rhizomatous herb	Apr-Sep	1B.2	S2	G5T2			• Marshes and swamps (freshwater, near coast)	3 m	75 m	yes
Sidalcea oregana ssp. valida	Kenwood Marsh checkerbloom	Malvaceae	perennial rhizomatous herb	Jun-Sep	1B.1	S1	G5T1	CE	FE	• Marshes and swamps (freshwater)	115 m	150 m	yes

Streptanthus hesperidis	green jewelflower	Brassicaceae	annual herb	May-Jul	1B.2	S2	G2			• Chaparral (openings) • Cismontane woodland	130 m	760 m	yes
Trifolium amoenum	two-fork clover	Fabaceae	annual herb	Apr-Jun	1B.1	S1	G1		FE	• Coastal bluff scrub • Valley and foothill grassland (sometimes serpentinite)	5 m	415 m	yes
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	annual herb	Apr-Oct	1B.1	S2	G2			• Broadleafed upland forest • Cismontane woodland • Coastal prairie	105 m	610 m	yes
Trifolium hydrophilum	saline clover	Fabaceae	annual herb	Apr-Jun	1B.2	S2	G2			• Marshes and swamps • Valley and foothill grassland (mesic, alkaline) • Vernal pools	0 m	300 m	yes
Trifolium polyodon	Pacific Grove clover	Fabaceae	annual herb	Apr-Jun(Jul)	1B.1	S1	G1	CR		• Closed-cone coniferous forest • Coastal prairie • Meadows and seeps • Valley and foothill grassland	5 m	425 m	yes
Triquetrella californica	coastal triquetrella	Pottiaceae	moss		1B.2	S2	G2			• Coastal bluff scrub • Coastal scrub	10 m	100 m	
Triteleia lugens	dark-mouthed triteleia	Themidaceae	perennial bulbiferous herb	Apr-Jun	4.3	S4?	G4?			• Broadleafed upland forest • Chaparral • Coastal scrub • Lower montane coniferous forest	100 m	1000 m	yes
Viburnum ellipticum	oval-leaved viburnum	Adoxaceae	perennial deciduous shrub	May-Jun	2B.3	S3?	G4G5			• Chaparral • Cismontane woodland • Lower montane coniferous forest	215 m	1400 m	

Suggested Citation

California Native Plant Society, Rare Plant Program. 2020. Inventory of Rare and Endangered Plants of California (online edition, v8-03 0.39). Website http://www.rareplants.cnps.org [accessed 02 January 2020].

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IPaC **U.S. Fish & Wildlife Service**

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

Sonoma County, California

Local office

Sacramento Fish And Wildlife Office

(916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

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.

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

Birds

NAME	STATUS
Northern Spotted Owl Strix occidentalis caurina There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/1123	Threatened
Yellow-billed Cuckoo Coccyzus americanus There is **proposed** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/3911	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6199	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened

Insects

NAME	STATUS

San Bruno Elfin Butterfly Callophrys mossii bayensis — Endangered
There is **proposed** critical habitat for this species. The location of the critical habitat is not available.
https://ecos.fws.gov/ecp/species/3394

Crustaceans

NAME	STATUS
California Freshwater Shrimp Syncaris pacifica No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7903	Endangered

Flowering Plants

NAME	STATUS
Burke's Goldfields Lasthenia burkei No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/4338	Endangered
Sonoma Sunshine Blennosperma bakeri No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/1260	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
California Red-legged Frog Rana draytonii https://ecos.fws.gov/ecp/species/2891#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.

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

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15

Common Yellowthroat Geothlypis trichas sinuosa — Breeds May 20 to Jul 31
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/2084

Golden Eagle Aquila chrysaetos — Breeds Jan 1 to Aug 31
This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Lewis's Woodpecker Melanerpes lewis — Breeds Apr 20 to Sep 30
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9408

Nuttall's Woodpecker Picoides nuttallii — Breeds Apr 1 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus — Breeds Mar 15 to Jul 15
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Rufous Hummingbird selasphorus rufus — Breeds elsewhere
This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/8002

Song Sparrow Melospiza melodia — Breeds Feb 20 to Sep 5
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Spotted Towhee Pipilo maculatus clementae — Breeds Apr 15 to Jul 20
This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/4243

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ

"Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

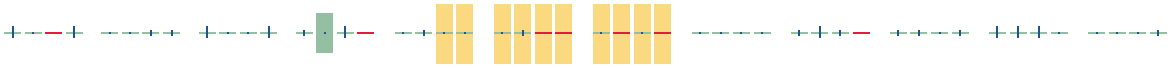
Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort – no data

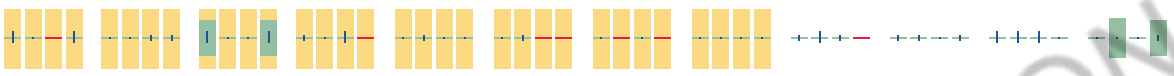
SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC

Allen's Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Common Yellowthroat
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

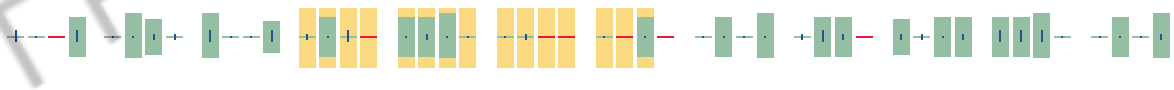


Golden Eagle
Non-BCC Vulnerable (This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.)



Lewis's Woodpecker
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Nuttall's Woodpecker
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

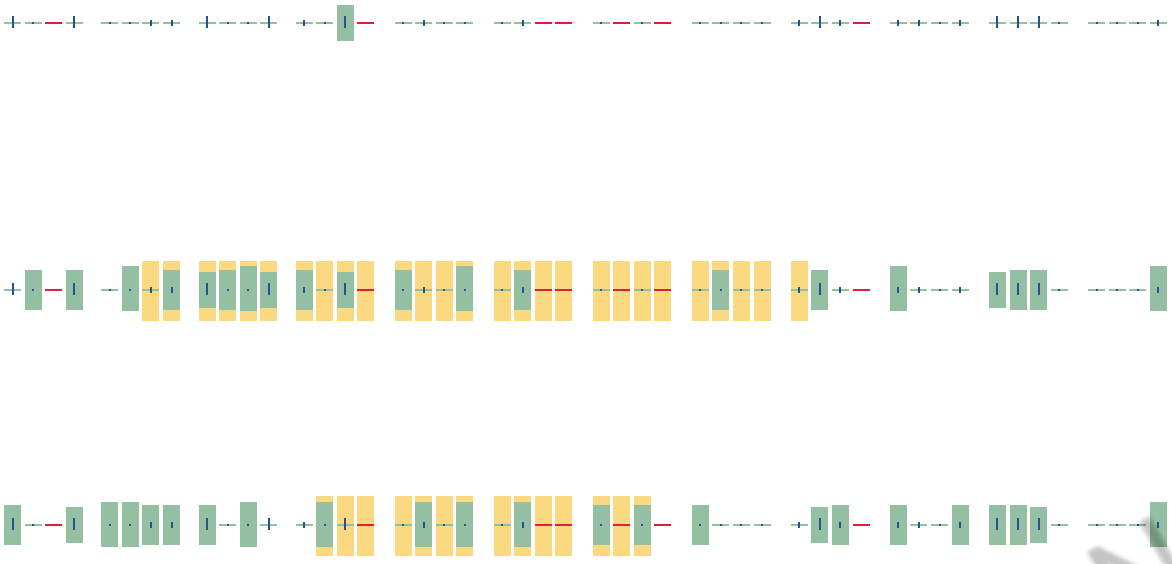


Oak Titmouse
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Rufous Hummingbird
BCC Rangewide (CON) (This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.)

Song Sparrow
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)

Spotted Towhee
BCC - BCR (This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA)



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 10km grid cell(s) 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 AKN Phenology 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 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 on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present 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 Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ “What does IPaC use to generate the migratory birds potentially occurring in my specified location”. Please be aware this report provides the “probability of presence” of birds within the 10

km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

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.

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the NWI map to view wetlands at this location.

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.

Appendix B2

Aquatic Resources Delineation Report

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January 21, 2021 12340

Kat Marian
Project Manager
Sonoma State University
1801 East Cotati Avenue
Rohnert Park, California 94928-3609

Subject: Aquatic Resources Jurisdictional Delineation for the Fairfield Osborn Preserve Visitor Center Improvement Project, Sonoma County, California

Dear Ms. Marian,

This technical report presents the findings of a jurisdictional delineation of aquatic resources conducted by Dudek for the proposed improvements to the visitor center at the Fairfield Osborn Preserve (the Preserve) in Sonoma county, California (Figure 1). The purpose of this investigation was to evaluate the presence and extent of aquatic resources that may be subject to the jurisdiction of the U.S. Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or the California Department of Fish and Wildlife (CDFW). The investigation included an analysis of aquatic resources within the vicinity of proposed improvements (the project site), plus a 300-foot buffer (the study area).

This report is intended to satisfy formal documentation according to the delineation guidelines and protocols stipulated by the USACE under Section 404 of the federal Clean Water Act (CWA) and the CDFW under Section 1600-1607 of the California Fish and Game Code (CFGC).

1 Study Area Location and Description

The proposed project consists of improvements to the existing visitor center and grounds at the Preserve on Sonoma Mountain near Penngrove. The 450-acre nature preserve is managed by the Sonoma State University (SSU) Center for Environmental Inquiry and serves as a teaching, gathering, and outdoor exploration space that is frequented by students, faculty, visitors, and community members including Native American tribes. The Preserve supports the Marjorie Osborn Education and Research Center (visitor center), outdoor support areas, and a trail system that allows access throughout the 450-acre open space area. The proposed project includes renovations to the main visitor center building, construction of two "talking circles," improved pedestrian circulation, parking and emergency access, and improved wayfinding signage on approximately 2.05 acres (the project site).

The study area encompasses the existing visitor center building, access roads, parking lot, small solar panel array and weather station, and portions of the Preserve's trail system. The study area is located on privately-owned land (Assessor Parcel Numbers 136-201-043 and 136-210-024) and surrounded by undeveloped, open space associated with the Preserve. The study area occurs at an elevation that ranges from 1,695 to 1,733 feet above mean sea level, and is located within Sections 23 and 26 of Township 6 North, Range 7 West, of the Glen Ellen California 7.5-minute U.S. Geological Survey quadrangle (Figure 1, Project Location).

For the purposes of this analysis, a 300-foot buffer was established around the project site to describe aquatic resources within the immediate vicinity of the project site (the study area). The study area encompasses a total of 18.75 acres and was evaluated for this aquatic resources jurisdictional delineation (Figure 2, Project Site).

To access the study area from Highway 101 heading north, exit on Old Redwood Highway North in Petaluma (Exit 476) and travel 1.5 miles, turn right onto Main Street/Petaluma Hill Road and travel approximately 2.3 miles. Turn right onto Roberts Ranch Road and travel 1.3 miles before turning right onto Lichau Road and continue for approximately 3.8 miles. The study area is located on the right side of the road and indicated by posted signs.

2 Proposed Project

The proposed project consists of improvements to the parking and emergency access at the northern end of the project site, reconstruction of the pedestrian path between the parking area and the existing visitor center, the creation of two outdoor seating areas (i.e., "talking circles") and construction of an outdoor trellised shade structure in the central project site, and interior and exterior improvements to the visitor center at the southern end of the project site. The preliminary architectural concept calls for the use of natural stone and other local materials throughout the areas proposed for improvement.

The two proposed talking circles would be built to the west of the existing visitor center, near the surrounding oak trees. The smaller talking circle would have permanent seating, which would be built of stone. The center of the circle would be surfaced with stone pavers, and California native plants would be planted around the perimeter. Small aisles amid the seating would allow people to enter and exit. This talking circle would have a constricted screening element between the back of the stone and the building, to visually screen the existing caretaker's residence from view from the circles. The larger talking circle would be more informal, with no permanent seating, and would be delineated by a decomposed granite surface with a low-profile weathering steel edging encircling its perimeter. This would allow flexibility for a large group educational event or, with the addition of temporary seating, a communal gathering place for a large group. The talking circle, as described above, would be a physically distinct space in the project site, but is also a means of communication rooted in the traditions of Native American tribes.

Proposed renovations to the visitor center are intended to better orient it to the preserve and provide a more welcoming visitor approach and entrance experience, and to accommodate an increased interest in and demand for community and educational instruction opportunities. The preliminary concept design proposes renovations to the west building elevation that include new glass doors and windows to provide better visual and physical connections between the indoor exhibit area and the proposed talking circles, such that the talking circles would be visible from the exhibit area even when the exterior doors facing them are closed. At the east end of the visitor center, two built elements will be added to engage visitors. One is a tiered seating area, or amphitheater, built into the existing hillside. The seating would be built of stone, to echo the seating in the small talking circle. An overhead shade trellis built of weathering steel would be added in the entry courtyard. The trellis is intended to draw visitors' attention and guide them toward the visitor center entrance.

Minimal interior improvements will be made to the center. One of the two restrooms will be enlarged to comply with accessibility requirements. The 7-foot, 10-inch high main exhibit area is proposed to be made more airy and spacious by removing existing plaster ceiling to expose wood trusses. Additional improvements include a

kitchenette remodel and upgraded interior finishes. The firewall between the visitor center and the adjoining caretaker's residence would be improved to meet current code (1-hour fire separation).

An existing pedestrian bridge that traverses a tributary to Copeland Creek will be reconstructed as part of the proposed pedestrian improvements. The walking surface of the bridge will be replaced, and any structural improvements made as needed. Paths on the site will be reconstructed with a decomposed granite surface and stone seating areas added. The parking lot will be enlarged to provide additional parking spaces, to include a total of 21 stalls (1 ADA van stall, 1 clean vehicle stall, 1 electric vehicle stall without charging capabilities, and 18 standard stalls). The lot's surface will remain gravel with the exception of paving for the handicap accessible space.

Signage will be added throughout the project site to help with wayfinding. These signage points would include large boulders, with signage made out of weathering steel. Safety lighting would be added to visitor center entrances. Solar-powered landscape lights are proposed for the pedestrian pathways (to provide safe travel between the parking lot and the visitor center).

Necessary improvements related to fire protection are proposed as part of the project. To improve access for standard fire apparatus, either a turnaround in the parking lot or south of the parking lot would be constructed. The preferred turnaround would be a 48-foot-clear radius in the center of the parking lot; however, an alternative option is to provide a "hammerhead" turnaround 120 feet in diameter, to allow a three-point turn, south of the parking lot.

Finally, a 12,020-gallon water storage tank would be constructed east of the parking lot and a dry hydrant[1] would be installed. These proposed improvements would provide the necessary vehicular access and water for firefighting purposes for first responders.

3 Summary of Regulations

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The USACE's Regulatory Program regulates activities pursuant to Section 404 of the CWA; the CDFW regulates activities under the CFGC Sections 1600–1616; and the RWQCB regulates activities under Section 401 of the CWA and the Porter–Cologne Water Quality Control Act (Porter–Cologne Act).

The USACE regulates "discharge of dredged or fill material" into "waters of the United States," which includes tidal waters, interstate waters, and all other waters that are part of a tributary system to interstate waters or to navigable "waters of the United States," the use, degradation, or destruction of which could affect interstate or foreign commerce or which are tributaries to waters subject to the ebb and flow of the tide (33 CFR, Part 328.3(a)), pursuant to provisions of Section 404 of the CWA. The USACE generally takes jurisdiction within rivers and streams to the "ordinary high water mark" (OHWM) determined by erosion, the deposition of vegetation or debris, and changes in vegetation. On January 23, 2020, the EPA and USACE published a final rule (33 CFR, Part 328) defining the scope of waters protected under the CWA in an effort to undo the broad interpretation of federal jurisdiction established in the 2015 "Clean Water Rule" (80 Federal Regulation 37053). The new rule, referred to as the "Navigable Waters Protection Rule," issued new regulations to redefine the types of waterbodies covered by the federal CWA, which dramatically narrowed the scope of the federal administration's regulatory authority compared to previous CWA

[1] A dry hydrant consists of a non-pressurized arrangement of piping with one end in the water and the other end extending to dry land.

regulations. As a result of the final rule, EPA and USACE define "waters of the United States" to include the following four categories: (1) the territorial seas and traditional navigable waters; (2) tributaries of such waters; (3) certain lakes, ponds, and impoundments of jurisdictional waters; and (4) wetlands adjacent to other jurisdictional waters (other than waters that are themselves wetlands). The USACE defines jurisdictional wetlands as areas that contain hydrophytic vegetation, hydric soils, and wetland hydrology, in accordance with the procedures established in the Corps Wetland Delineation Manual (USACE 1987) and the Regional Supplement to the Wetland Delineation Manual: Arid West Region (USACE 2008b).

In accordance with Section 1602 of the CFGC (Lake and Streambed Alteration), the CDFW regulates activities that "will substantially divert, obstruct, or substantially change the natural flow or bed, channel or bank, of any river, stream, or lake designated by the Department in which there is at any time an existing fish or wildlife resource or from which these resources derive benefit." The CDFW takes jurisdiction to the top of bank of the stream, or the limit of the adjacent riparian vegetation, referred to in this report as "streambed and associated riparian habitats." Lake and Streambed Alteration Agreement applications to the CDFW must include a draft California Environmental Quality Act (CEQA) document for the application to be deemed complete by CDFW. A complete certified or adopted CEQA document must be received before the CDFW can issue a Lake and Streambed Alteration Agreement.

The RWQCB regulates "discharging waste, or proposing to discharge waste, within any region that could affect the waters of the State" (Water Code Section 13260 (a)), pursuant to provisions of the Porter–Cologne Act. "Waters of the State" are defined as "any surface water or groundwater, including saline waters, within the boundaries of the state" (Water Code Section 13050 (e)). Before the USACE will issue a CWA Section 404 permit, applicants must receive a CWA Section 401 Water Quality Certification from the RWQCB. If a CWA Section 404 permit is not required for the project, the RWQCB may still require a permit (i.e., Waste Discharge Requirement) under the Porter–Cologne Act. Applications to the RWQCB must also include a complete certified or adopted CEQA document to be deemed complete by RWQCB.

4 Methods

Data regarding aquatic resources present within the study area were obtained through a review of pertinent literature and field assessment; both are described in detail below.

4.1 Literature Review

Prior to visiting the study area, potential and/or historic drainages and aquatic features were investigated based on a review of the following: USGS topographic maps (1:24,000 scale), aerial imagery, the National Wetland Inventory (NWI) database (USFWS 2020), and the Natural Resource Conservation Service (NRCS) Web Soil Survey (2020). In addition, hydrologic information from gauge stations within the vicinity of the study area was obtained.

4.2 Aquatic Resources Field Delineation

Following the initial data collection, Dudek wetland delineator Allie Sennett performed a formal (routine) wetlands delineation within the study area on December 29, 2020. All areas that were identified as being potentially subject to the jurisdiction of the USACE, RWQCB, and CDFW were field verified and mapped.

The USACE wetlands delineation was performed in accordance with the Corps Wetlands Delineation Manual (USACE 1987), Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0) (USACE 2008a), A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the United States (USACE 2008b), and guidance provided by the USACE and EPA on the geographic extent of federal jurisdiction (Navigable Waters Protection Rule; 33 CFR, Part 328).

For potential wetland areas, data on vegetation, hydrology, and soils were collected on standardized wetland delineation data forms in representative locations to assess the potential for hydric soils, hydrophytic vegetation, and hydrology. The wetland indicator status was assigned to each plant species using the Arid West 2018 Regional Wetland Plant List (USACE 2018), as shown in Table 1 below. Dominant plant species encountered within the study area were identified to the lowest taxonomic level needed to determine wetland plant indicator status. Those species that could not be immediately identified were brought into the laboratory for further investigation.

Table 1. Summary of Wetland Indicator Status

Category	Probability
Obligate Wetland (OBL)	Almost always occur in wetlands (estimated probability of >99%)
Facultative Wetland (FACW)	Usually occur in wetlands (estimated probability of 67% to 99%)
Facultative (FAC)	Equally likely to occur in wetlands/non-wetlands (estimated probability of 34% to 66%)
Facultative Upland (FACU)	Usually occur in non-wetlands (estimated probability 67% to 99%)
Obligate Upland (UPL)	Almost always occur in non-wetlands (estimated probability >99%)
No Indicator (NI)	—

Non-wetland waters of the United States were delineated based on the limits of an OHWM. During the jurisdictional delineation, drainage features were examined for evidence of an OHWM, saturation, presence of surface water, wetland vegetation, and nexus to a traditional navigable water of the United States. If any of these criteria were met, transects were run to determine the extent of each regulatory agency's jurisdiction.

Transects were taken at representative locations where streambed conditions varied. In dynamic reaches, transects were taken more frequently to capture channel morphology. Data on transect widths, dominant vegetation present within the drainage and in the adjacent uplands, and channel morphology were recorded on field forms.

Areas regulated by the RWQCB are generally coincident with the USACE but include features isolated from navigable waters of the United States that have evidence of surface water inundation. The CDFW jurisdiction was defined to the bank of the stream/channels also known as the top of bank or to the limit of the adjacent riparian vegetation.

Wetland and non-wetland waters were mapped during the field observation to obtain characteristic parameters and detailed descriptions using standard measurement tools. The location of transects, upstream and downstream extents of each feature, and sample points were collected in the field using an aerial photograph and topographic map of the study area, and a Trimble R1 GNSS Receiver with sub-meter accuracy and ArcGIS Collector app for iOS. A Dudek geographic information system (GIS) technician digitized the jurisdictional extents based on the transect measurements and GPS data into a project-specific GIS using ArcGIS software.

5 Results

Dudek used the methods described above to determine the presence or absence of USACE, RWQCB, and CDFW jurisdiction within the study area. A tributary to Copeland Creek ('seasonal drainage') and two seasonal wetlands were investigated within the study area as potential jurisdictional resources. The determination of aquatic resource jurisdiction within the study area was supported by information obtained from the USGS topographic map, Web Soil Survey, USFWS NWI map, and field assessment. Information obtained from each source is described below.

5.1 USGS Topographic and Watershed Map Review

The USGS 7.5-minute Glen Ellen, California topographic map (USGS 2018) was utilized to identify natural and man-made features occurring within the vicinity of the study area. Information obtained from the map included contour lines, streets, streams, railroad lines, and vegetation. The Glen Ellen topographic map was based on National Agriculture Imagery Program imagery from May 2012 and National Elevation Dataset contours from 1999. The study area was generally mapped as undeveloped land. Lichau Road appears as an arterial road. Copeland Creek is mapped as a "blue-line" drainage that occurs south of the study area. No other aquatic features or significant structural features are identified on the map within the study area's boundaries.

The study area occurs within the Laguna Hydrologic Subarea (114.21) of the Middle Russian River Hydrologic Area (114.20), which occurs within the larger Russian River Hydrologic Unit (NCRWQCB 2018). According to the USGS, the study area occurs in the Russian River watershed (HUC8: 18010110; USGS 2020). Sources of hydrology in the study area include runoff from adjacent foothill slopes and local precipitation. A tributary to Copeland Creek (a tributary to the Russian River) bisects the study area and is characterized as a natural earthen seasonal drainage associated with a mixed oak woodland vegetation community. An existing pedestrian bridge traverses the drainage near the center of the study area.

5.2 Soil Survey Review

The U.S. Department of Agriculture, Natural Resources Conservation Service's Web Soil Survey for Sonoma County, California (USDA 2020) was consulted and identified four soil associations as occurring throughout the study area: the Goulding clay loam, 30 to 50 percent slopes (GgF); Goulding cobbly clay loam, 15 to 30 percent slopes (GlE); Toomes rocky loam, 2 to 30 percent slopes (ToE); and Toomes rocky loam, 30 to 75 percent slopes (ToG) (Figure 3, Project Soils). Each of these soil types is described in further detail below.

Goulding clay loam, 30 to 50 percent slopes. The Goulding series consist of soils on backslopes of hills and derived from residuum weathered from metavolcanics. This soil is shallow with a restrictive bedrock layer from 8 to 20 inches. Goulding soils are well-drained and have very slow infiltration and very slow water transmission rate (hydrologic soil group D). This soil series is not listed as hydric (USDA 2020).

Goulding cobbly clay loam, 15 to 30 percent slopes. The Goulding series consists of soils on backslopes of hills and derived from residuum weathered from metavolcanics. This soil is shallow with a restrictive bedrock layer from 8 to 20 inches. Goulding soils are well-drained and have very slow infiltration and very slow water transmission rate (hydrologic soil group D). This soil series is not listed as hydric (USDA 2020).

Toomes rocky loam, 2 to 30 percent slopes. The Toomes series consists of soils on backslopes of hills and derived from residuum weathered from igneous rock. This soil is shallow with a restrictive bedrock layer from 4 to 20 inches. Toomes soils are well-drained and have very slow infiltration and very slow water transmission rate (hydrologic soil group D). This soil series is not listed as hydric (USDA 2020).

Toomes rocky loam, 30 to 75 percent slopes. The Toomes series consists of soils on backslopes of hills and derived from residuum weathered from igneous rock. This soil is shallow with a restrictive bedrock layer from 4 to 20 inches. Toomes soils are well-drained and have very slow infiltration and very slow water transmission rate (hydrologic soil group D). This soil series is not listed as hydric (USDA 2020).

None of the soil mapping units identified within the study area are listed as a hydric soil. Hydric soils are defined by the National Technical Committee for Hydric Soils as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part. Under natural conditions, these soils are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation. Soils encountered during the field visit were clay loam with some interspersed cobble or gravel and generally matched the USDA soil mapping series.

5.3 National Wetlands Inventory Review

The National Wetlands Inventory (NWI) does not identify any aquatic resources within the study area. The NWI identifies one depressional feature located approximately 600 feet northeast of the study area: a palustrine system that includes aquatic beds that are permanently flooded and created/modified by man-made barriers (PABHh; Figure 4, Hydrologic Setting). The NWI classifies palustrine systems as encompassing all nontidal wetlands dominated by trees, shrubs, persistent emergent, and wetlands that occur in tidal areas where salinity is below 0.5 parts per thousand. The palustrine system includes wetlands traditionally referred to as marshes, swamps, bogs, fens, and prairies. The NWI dataset is based on coarse aerial mapping and may not capture aquatic resources that are obscured by tree canopy or are otherwise not visible in aerial photography.

5.4 Climate and Rainfall Data Review

The study area is located in the outer North Coast Ranges geographic subdivision of the California Floristic Province (Jepson Flora Project 2020). Annual temperatures in the study area region range from 37.2°F to 88.6°F, and the average annual precipitation is 29.43 inches. On average, the month with the highest rainfall is January (average 6.14 inches), and July has the least precipitation (average 0.03 inch) (WRCC 2020).

According to data from the Santa Rosa Weather Station Gauge, total precipitation recorded from October 1, 2020, through December 28, 2020, was 1.3 inches, approximately 4.5% of normal (CDEC 2020). Therefore, the study area region had below normal hydrological conditions in the year preceding the survey. The Santa Rosa Weather Station Gauge is located approximately 11 miles northwest of the study area at an elevation of approximately 140 feet above mean sea level.

5.5 Aquatic Resources Field Delineation

5.5.1 Aquatic Resources

A tributary to Copeland Creek ('seasonal drainage') and two seasonal wetlands were investigated and mapped within the study area during the field assessment. Figures 5 and 6 illustrate the location and extent of federal and state jurisdiction, respectively, within the study area. Table 2 summarizes the amount of jurisdiction calculated within the study area. A description of aquatic resources within the study area is provided below, and representative photographs of these resources are provided in Attachment A. Attachment B contains the channel and wetland data forms completed during the field delineation, which are also summarized in Section 5.5.2 below.

Table 2. Summary of Jurisdictional Aquatic Resources

Feature	Cowardin Code [1]	Width (feet)		Length (feet)	Area (acres)		
		USACE	RWQCB/ CDFW	USACE/RWQCB/CDFW	USACE	RWQCB	CDFW
Seasonal Drainage	R4	3-10	15-25	1,114	0.23	0.30	0.30
Seasonal Wetland 1	PEM	–	–	–	–	<0.01	–
Seasonal Wetland 2	PEM	–	–	–	–	0.01	–
			Total	1,114	0.23	0.31	0.30

[1] **Source:** USFWS 1992. PEM = palustrine, emergent; R4 = intermittent, riverine.

Seasonal Drainage. Approximately 1,114 linear feet of a seasonal drainage bisects the study area. When inundated, this feature transports surface water within the study area from northeast to southwest before merging with Copeland Creek, approximately 0.35 mile southwest of the study area. A single multi-span wooden pedestrian bridge and an adjacent two-track Arizona crossing traverse the drainage near the middle of the study area. The Arizona crossing provides access to an existing building and dirt road southeast of the drainage. In addition, an old stone wall is present on both sides of the intermittent drainage, approximately 400 feet downstream of the pedestrian bridge. Lichau Road and a gravel access road are located approximately 50 to 80 feet northwest (and upslope) of the drainage.

No flowing water was present in the drainage during the December 2020 field delineation. Several shallow discontinuous pools (approximately 1 to 3 inches in depth) were documented at low depressions within the drainage, specifically underneath and downstream of the pedestrian bridge. No water or saturated soils were documented in the drainage upstream of the pedestrian bridge. A majority of the drainage is incised with undercut banks and exposed tree roots occur at multiple locations. The streambed contains a mixture of sand, gravel, cobble, and occasionally boulders, as well as woody debris in a few locations. Emergent vegetation observed in the drainage during the field delineation was generally sparse and limited to wetter areas downstream of the pedestrian bridge. Where present, emergent plants included annual semaphoregrass (*Pleuropogon californicus*; OBL), western rush (*Juncus patens*; FACW), and annual rabbitsfoot grass (*Polypogon monspeliensis*; FACW).

There is no dominant riparian vegetation or corridor associated with the seasonal drainage in the study area. Dominant trees rooted within or just above the OHWM or top of bank of the drainage consist of upland oaks, such

as coast live oak (*Quercus agrifolia*; NI), Oregon white oak (*Quercus garryana*; UPL), and California black oak (*Quercus kelloggii*; NI). The understory on both sides of the drainage supports widely scattered shrubs and vines, including common snowberry (*Symphoricarpos albus*; FACU), poison oak (*Toxicodendron diversilobum*; FACU), and hillside gooseberry (*Ribes californicum*; NI). California bay (*Umbellularia californica*; FAC) is occasionally present along the drainage south of the pedestrian bridge. The herbaceous layer is poorly developed below the tree canopy where leaf litter is thick on the ground surface. Where present, herbaceous plants include annual dogtails (*Cynosurus echinatus*; NI), clover (*Trifolium* sp.; indicator status varies), and California brome (*Bromus sitchensis* var. *carinatus*; NI).

The USACE jurisdictional width encompasses the lateral extent of the seasonal drainage's OHWM and ranges from 3 to 10 feet within the survey area. A total of 0.23 acre of USACE jurisdictional non-wetland waters of the United States occur within the drainage (Figure 5, USACE-Jurisdictional Aquatic Resources).

The CDFW and RWQCB jurisdictional width encompasses the lateral extent of the drainage's top of bank and ranges from 15 to 25 feet within the survey area. A total of 0.30 acre of CDFW and RWQCB jurisdictional non-wetland waters of the State occur within the survey area (Figure 6, CDFW/RWQCB-Jurisdictional Aquatic Resources).

Seasonal Wetlands 1 and 2. Two seasonal wetlands comprising approximately 0.02 acre are present in the northwest portion of the study area, approximately 130 to 190 feet north of the seasonal drainage. Both features only appears to be inundated seasonally by precipitation, and are physically and hydrologically isolated from the seasonal drainage. These features are discernible from the adjacent upland areas by a distinct change in vegetation. Wetland data stations were established at these features to collected characteristic parameters and determine jurisdictional status. Both features supported a dominance of hydrophytic vegetation species, including rye grass (FAC), annual rabbitsfoot grass (*Polypogon monspeliensis*; FACW), hyssop loosestrife (*Lythrum hyssopifolium*; OBL), and pennyroyal (*Mentha pulegium*; OBL). The wetlands contained obvious hydric soils, as indicated by redox dark surface (Hydric Soil Indicator F6) and redox depressions (Hydric Soil Indicator F8). Wetland hydrology was confirmed by the presence of oxidized rhizospheres along living roots (Hydrology Indicator C3) and saturation visible on aerial imagery (Hydrology Indicator C9). No surface water or saturation was present in the wetland during the October 2020 fieldwork.

Seasonal wetlands 1 and 2 are isolated features that do not have a direct physical or hydrologic influence on an abutting water of the United States. Therefore, the two seasonal wetlands do not meet the definition of a waters of the United States or adjacent wetlands under USACE jurisdiction. Similarly, these features do not appear to meet the definition of a river, stream, or lake under CDFW jurisdiction. CDFW regulates wetlands associated with stream and lake systems, such as riparian corridors or fringe wetlands.

However, contrary to the USACE, the RWQCB asserts jurisdiction under the CWA over wetlands that are isolated from navigable waters of the United States. Therefore, seasonal wetlands 1 and 2 are anticipated to be regulated as wetland waters of the state by the RWQCB.

5.5.2 Data Summary

Results from observable field indicators from five wetland data stations and two stream transects indicate that three aquatic resources occur within the study area (Figure 5, USACE Jurisdictional Aquatic Resources, and Figure 6,

CDFW/RWQCB Jurisdictional Aquatic Resources). The data collected at each data point and transect are included in Attachment C and summarized in Tables 3 and 4 below.

Table 3. Wetland Data Station Summary

Data Point	Wetland Determination Field Indicators			Location		Determination
	Vegetation	Soils	Hydrology	Latitude	Longitude	
1 (seasonal drainage)	No	Yes	No	38.343820	-122.594515	Non-wetland (upland)
2 (seasonal wetland 1)	Yes	Yes	Yes	38.344713	-122.594300	Wetland (isolated)
3 (seasonal wetland 1)	No	No	No	38.344698	-122.594276	Non-wetland (upland)
4 (seasonal wetland 2)	Yes	Yes	Yes	38.344879	-122.593758	Wetland (isolated)
5 (seasonal wetland 2)	No	No	No	38.344840	-122.593736	Non-wetland (upland)

Table 4 – Transect Data Summary

Transect	Channel Indicators	Location		Determination
		Latitude	Longitude	
1 (seasonal drainage)	Destruction of terrestrial vegetation, wracking, sediment sorting, bed and banks, change in plant community and/or cover	38.343680	-122.594674	Waters of the U.S./State
2 (seasonal drainage)	Shelving, destruction of terrestrial vegetation, presence of litter and debris, wracking, sediment sorting, scour, bed and banks, change in plant community and/or cover	38.343541	-122.595077	Waters of the U.S./State

6 Conclusion

The purpose of this report is to identify and delineate all jurisdictional aquatic resources regulated by the USACE, RWQCB, and/or CDFW within the study area. This report represents existing conditions only and does not address any activities proposed within the study area. Information contained within this report will be utilized to determine the location and extent of potential impacts to jurisdictional aquatic resources associated with future construction activities within the study area.

Dudek delineated one seasonal drainage and two seasonal wetlands. Approximately 1,114 linear feet of the seasonal drainage within the study area are expected to be under the joint jurisdiction of USACE, RWQCB, and CDFW. The drainage's OHWM represents approximately 0.23 acre under USACE jurisdiction, and the lateral extent of the drainage's top of bank represents approximately 0.30 acre under RWQCB and CDFW jurisdiction. The USACE jurisdiction overlaps and is a subset of the CDFW and RWQCB acreage. The two isolated seasonal wetlands that comprise 0.02 acre in the study area are anticipated to be within RWQCB jurisdiction only. However, final

determinations of jurisdictional extents cannot be made until the resource agencies have verified the findings of this investigation.

Any proposal that involves impacting jurisdictional drainages or wetlands within the study area through filling, stockpiling, conversion to a storm drain, channelization, bank stabilization, road or utility line crossings, maintenance, or any other modification would require permits from the USACE, RWQCB, and/or CDFW before any earth-moving activities could commence. Both permanent and temporary impacts are regulated and would trigger the need for these permits. Processing of the USACE's CWA Section 404 permit, the RWQCB's CWA Section 401 permit, and the CDFW's CFGC Section 1602 permit can occur concurrently, and can utilize the same information and analysis. The USACE will not issue its authorization until the RWQCB completes the CWA Section 401 permit.

If you have any questions regarding the contents of this report, please contact me by email (asennett@dudek.com) or phone 760.936.7969.

Sincerely,

Allie Sennett
Biologist

Att.: *Figures 1 – 6*
A – Representative Site Photographs
B – OHWM and Wetland Data Forms
C – Aquatic Resources Spreadsheet

cc: *Ryan Henry, Dudek*
Stephanie Strelow, Dudek

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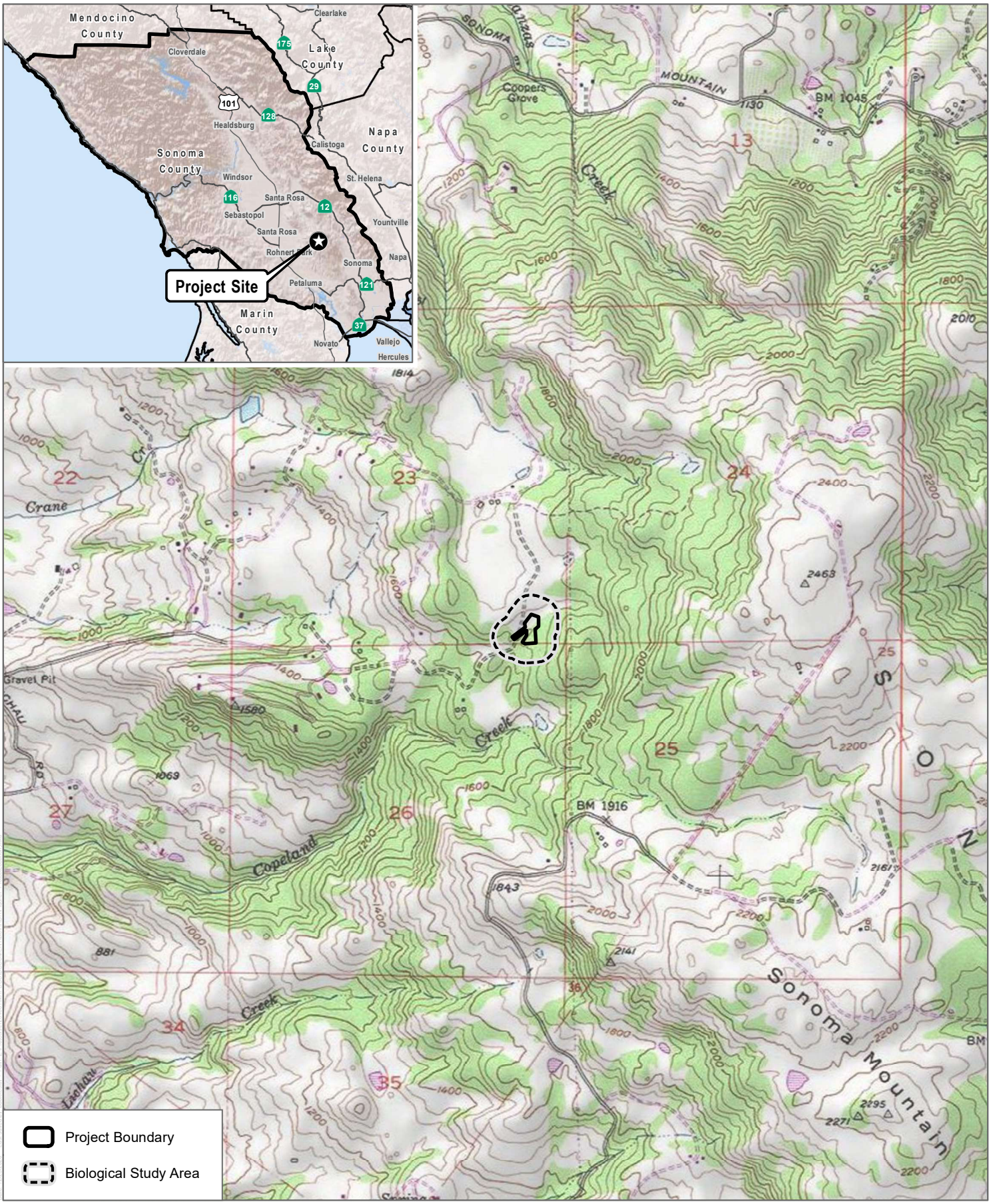


SOURCE: USGS 7.5 Minute Series Glen Ellen Quadrangle

DUDEK

0 1,000 2,000 Feet

FIGURE 1

Project Location

Fairfield Osborn Preserve Visitor Center Improvement Project

SOURCE: ESRI 2018

DUDEK

0 75 150 Feet

FIGURE 2

Project Site

Fairfield Osborn Preserve Visitor Center Improvement Project

SOURCE: ESRI 2018, USDA 2017

DUDEK

0 100 200 Feet

FIGURE 3

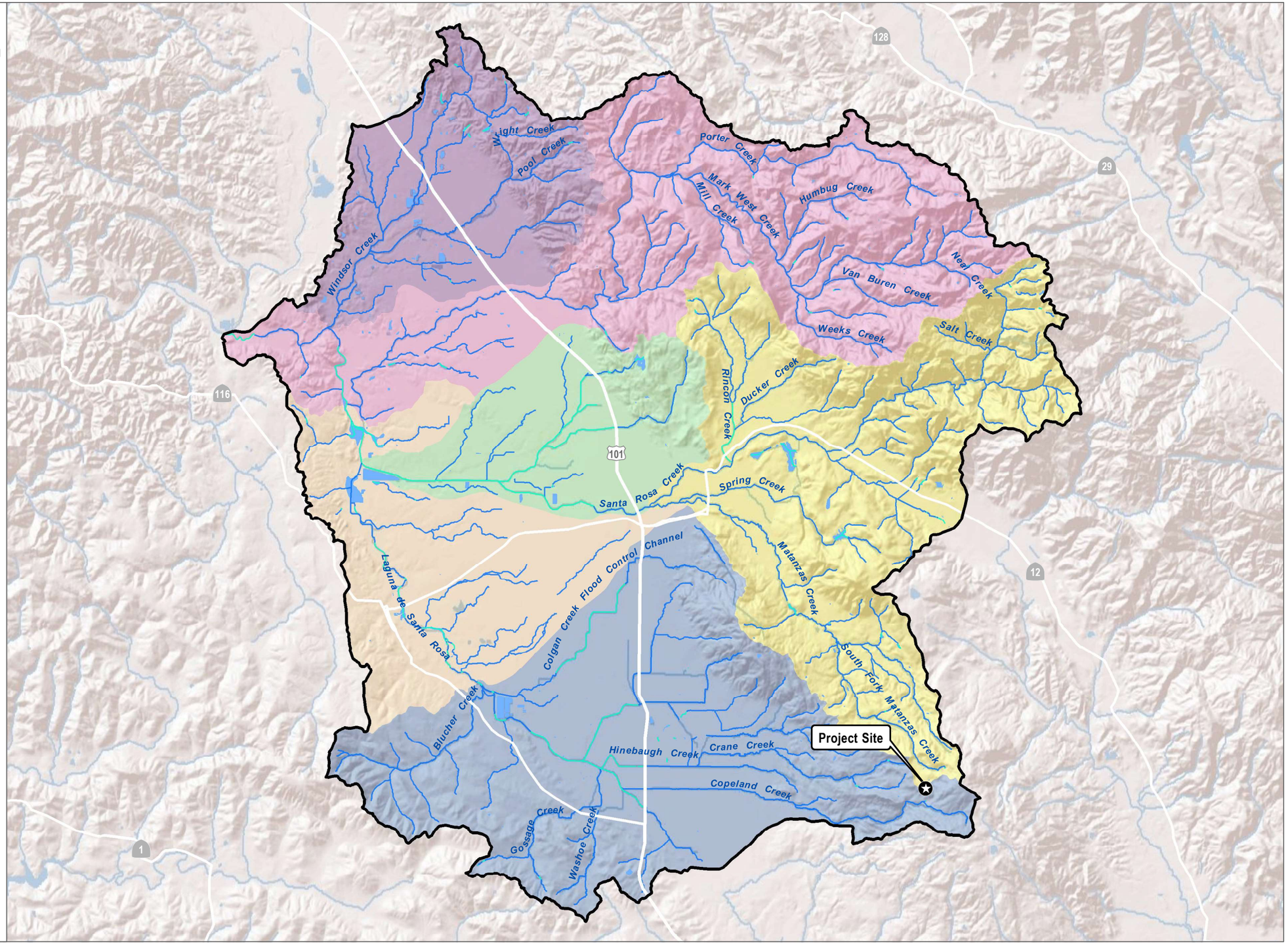
Project Soils

Fairfield Osborn Preserve Visitor Center Improvement Project

Mark West Creek Watershed (HUC 10)

Subwatersheds (HUC 12) within Mark West Creek Watershed

- Upper Laguna De Santa Rosa
- Lower Laguna De Santa Rosa
- Lower Santa Rosa Creek
- Porter Creek-Mark West Creek
- Upper Santa Rosa Creek
- Windsor Creek



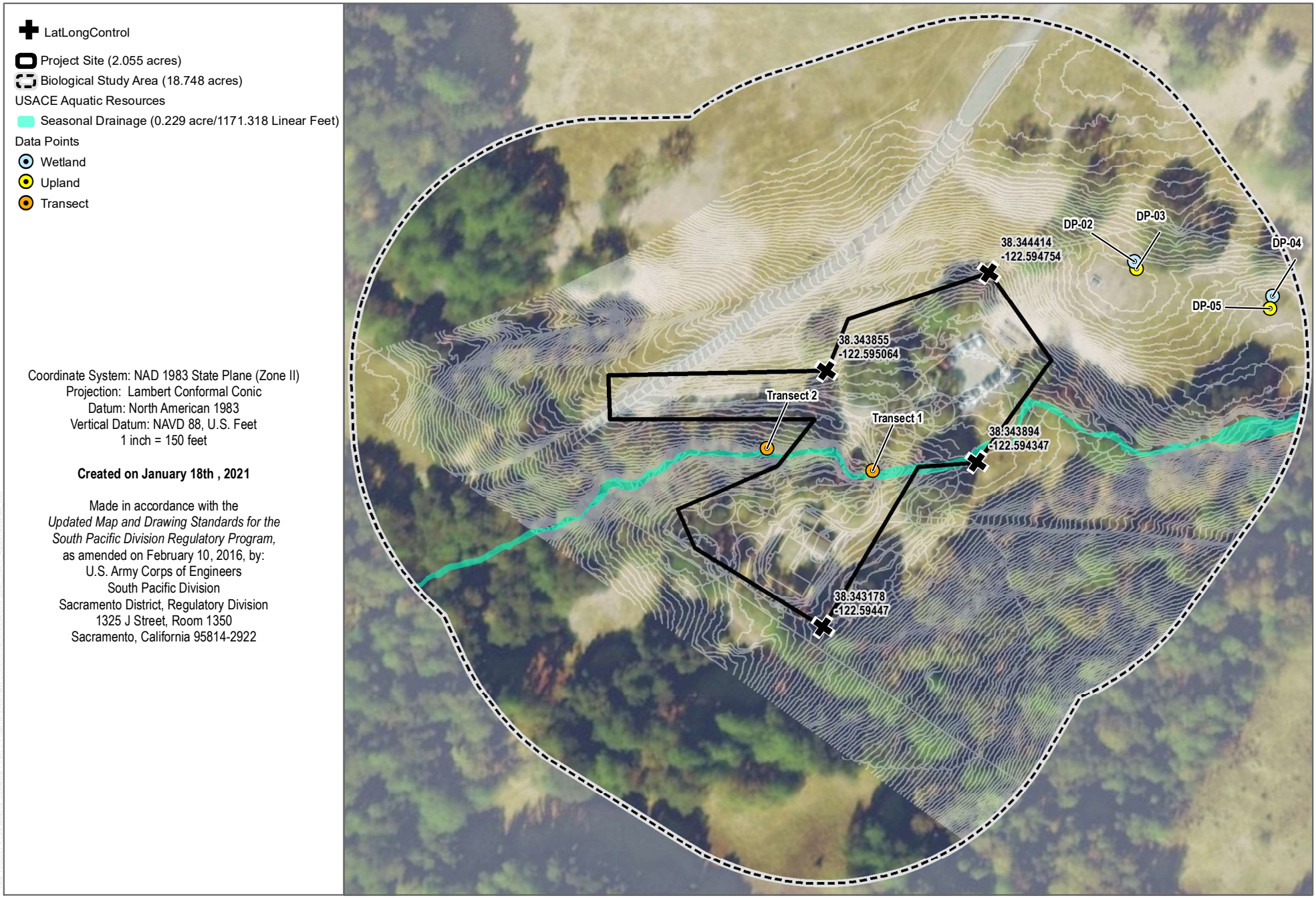
SOURCE: Imagery: ESRI World Imagery 2020;
Project Watersheds & Flowlines: USGS National Hydrologic Dataset and Watershed Boundary Dataset 2018

DUDEK

FIGURE 4

Hydrologic Setting

Fairfield Osborn Preserve Visitor Center Improvement Project



SOURCE: ESRI 2020, EBA Engineering 2019

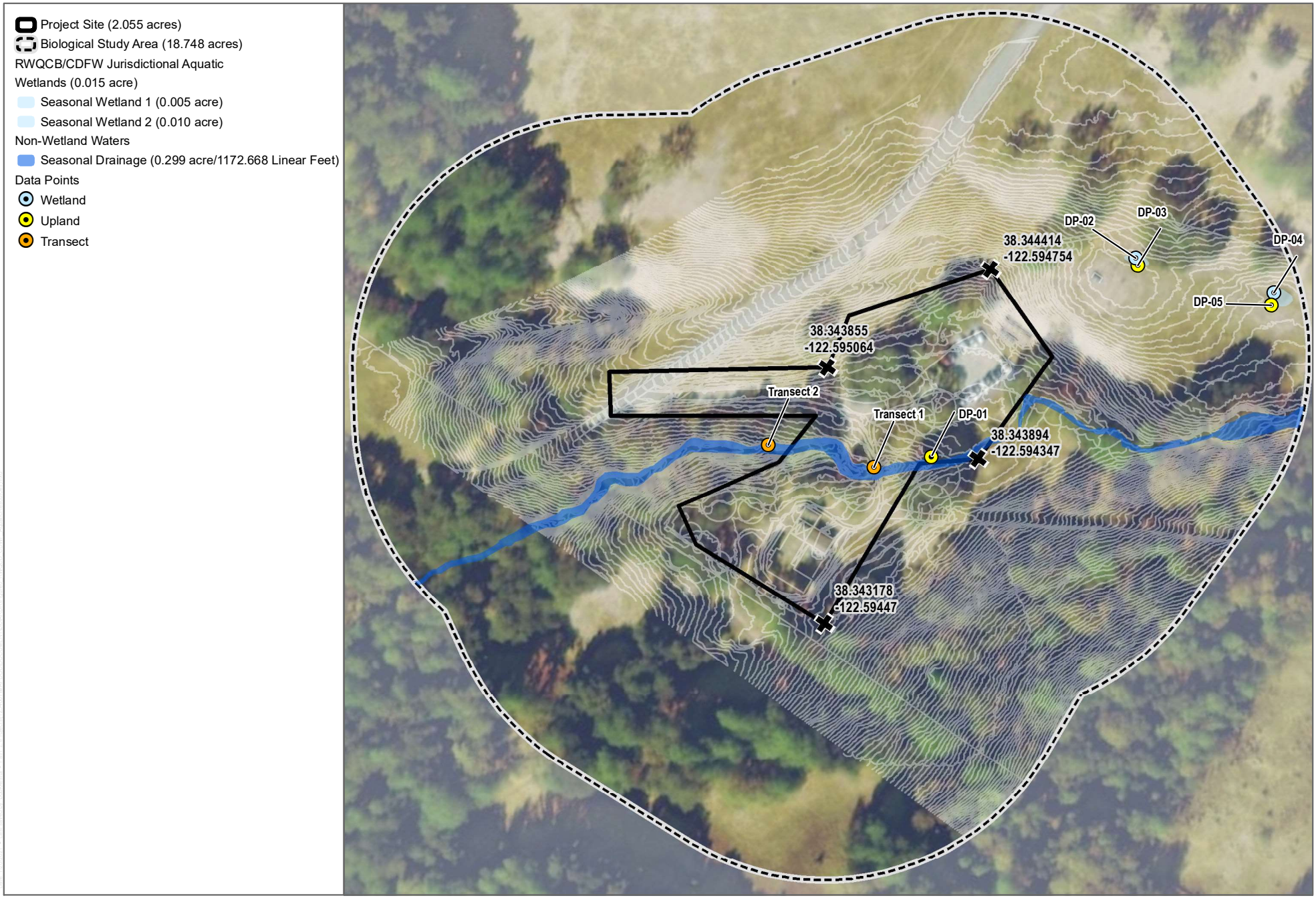
DUDEK

0 75 150 Feet

FIGURE 5

USACE Jurisdictional Aquatic Resources Delineation

Fairfield Osborn Preserve Visitor Center Improvement Project



SOURCE: ESRI 2020, EBA Engineering 2019

DUDEK

0 75 150 Feet

FIGURE 6

RWQCB/CDFW Jurisdictional Aquatic Resources

Fairfield Osborn Preserve Visitor Center Improvement Project

Attachment A

Representative Site Photographs

Photograph 1: View facing southeast of the seasonal drainage and pedestrian bridge near the center of the study area (December 29, 2020).

Photograph 2: View facing northeast of the seasonal drainage just upstream of the pedestrian bridge (December 29, 2020).

Photograph 3: View facing west of the seasonal drainage and drive-thru crossing just west of the pedestrian bridge (December 29, 2020).

Photograph 4: View facing southwest of the seasonal drainage downstream of the pedestrian bridge (December 29, 2020).

Photograph 5: View facing southwest of the seasonal drainage downstream of the pedestrian bridge (December 29, 2020).

Photograph 6: View facing northeast of the seasonal drainage in the northeastern extent of the study area (December 29, 2020).

Photograph 7: View facing southwest of the seasonal drainage upstream of the pedestrian bridge (December 29, 2020).

Photograph 8: View facing east of seasonal wetland 1. The shovel indicates the location of data station DP-2 (December 29, 2020).

Photograph 9: View facing northwest of seasonal wetland 2. The shovel indicates the location of data station DP-4 (December 29, 2020).

Photograph 10: View facing northeast of the property entrance and access road in the western portion of the study area (December 29, 2020).

Attachment B

OHWM and Wetland Data Forms

OHWM DATA SHEET

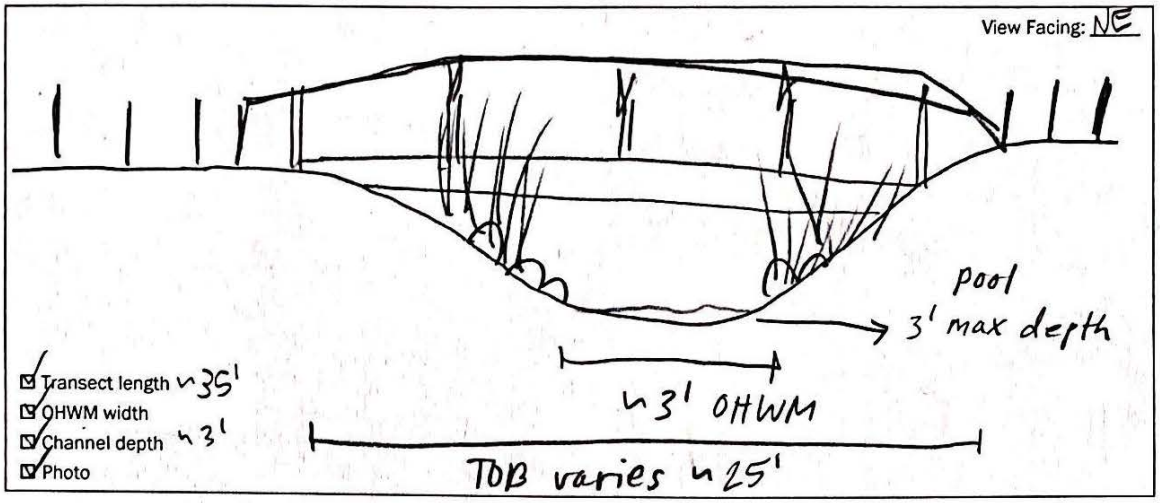
Project: _____ Date: 12/30/2020 Transect: 1

Investigator(s): A. Sennett Feature Name: ID-1

Site Location:
intermittent creek @ pedestrian bridge

Feature Type: ☐ Ephemeral ☑ Intermittent ☐ Perennial ☐ Other

Transect (cross-section) drawing(s):



Break in Slope at OHWM: ☐ Sharp (>60°) ☐ Moderate (30-60°) ☐ Gentle (<30°)

☐ Natural line impressed on the bank	☑ Sediment sorting
☐ Shelving	☐ Leaf litter disturbed or washed away
☐ Changes in the character of soil	☐ Scour
☑ Destruction of terrestrial vegetation	☐ Deposition
☐ Presence of litter and debris	☑ Bed and banks
☑ Wracking	☐ Water staining
☐ Vegetation matted down, bent, or absent	☑ Change in plant community and/or cover

	Clay/Silt	Sand	Gravel	Cobbles	Boulders
Above OHWM	100				
Below OHWM	25	25	25	25	0

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM	0	0	35	65
Below OHWM	0	0	10	90

Stage: ☐ Early (herbs & seedlings) ☐ Mid (herbs, shrubs, saplings) ☐ Late (herbs, shrubs, mature trees)

Upland Species:	*Bank Species:*	*Emergent Species:*
Same as dominant upland spp. CYNECH + TORARV...	Juncus sp. FESPER	J. patens Semiphore grass POLMON

Version 2; updated 11/16/2020

OHWM DATA SHEET

Condition/Disturbances (e.g., erosion, grazing, culverts, etc.):
pedestrian bridge + two-track crossing/LWC

Hydrology:

- ☐ Flowing water
- ☑ Standing water
- ☑ Saturated
- ☐ Dry

Avg. depth: 1 | Min. depth: 0
Temp: NA | Max. depth: 3

Checklist of resources (if available):

☑ Aerial photography	☐ Vegetation maps	☑ GPS unit
☐ Remotely-sensed images	☑ Soil maps	☐ Stream gage data
☑ Topographic maps	☑ Rainfall/precipitation data	☐ Other studies:
☐ Geologic maps	☐ Existing delineation(s) for site	

Other drawings (plan view), notes:

wracking present just upstream of transect – channel is more incised upstream of bridge/transect.

Other forms related to this feature: ☐ Yes ☐ No

- ☐ Terrace, fringe, or floodplain wetland (wetland datasheet)
- ☐ Low flow channel or other representative section (OHWM datasheet)

Version 2; updated 11/16/2020

OHWM DATA SHEET

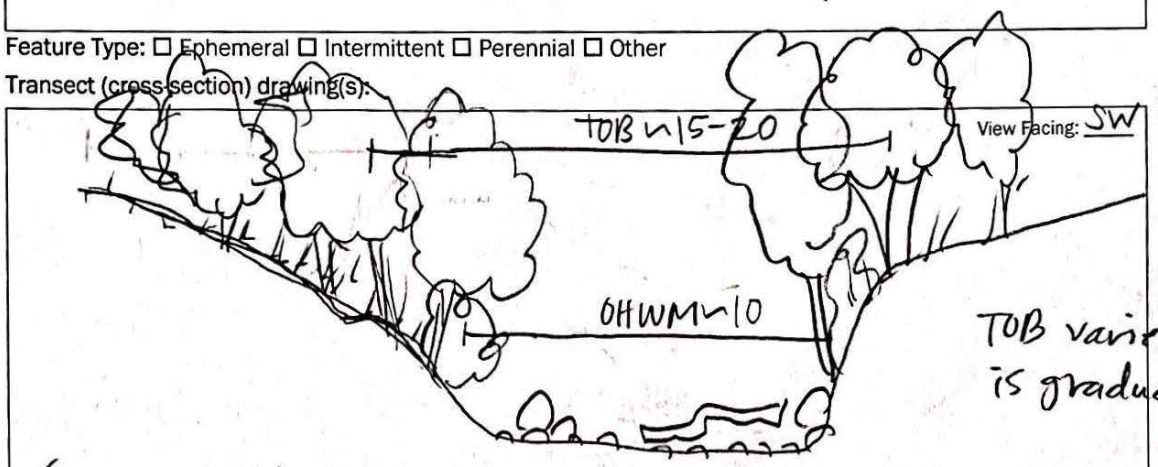
Project: _____ Date: 12/29/2020 Transect: 2

Investigator(s): A.Sennett Feature Name: ID-1

Site Location: downstream of pedestrian bridge

Feature Type: ☐ Ephemeral ☐ Intermittent ☐ Perennial ☐ Other

Transect (cross-section) drawing(s):



☑ Transect length ~35'
☑ OHWM width
☑ Channel depth
☑ Photo

Break in Slope at OHWM: ☐ Sharp (>60°) ☐ Moderate (30-60°) ☑ Gentle (<30°)

☐ Natural line impressed on the bank	☑ Sediment sorting
☑ Shelving	☐ Leaf litter disturbed or washed away
☐ Changes in the character of soil	☑ Scour
☑ Destruction of terrestrial vegetation	☐ Deposition
☑ Presence of litter and debris	☑ Bed and banks
☑ Wracking	☐ Water staining
☐ Vegetation matted down, bent, or absent	☐ Change in plant community and/or cover

	Clay/Silt	Sand	Gravel	Cobbles	Boulders
Above OHWM	95	0	0	5	0 → some scattered large cobble
Below OHWM	0	20	40	30	10

	Tree (%)	Shrub (%)	Herb (%)	Bare (%)
Above OHWM	70	5	25	60
Below OHWM	30	0	5	95

overhanging veg not rooted <OHWM

Stage: ☐ Early (herbs & seedlings) ☐ Mid (herbs, shrubs, saplings) ☐ Late (herbs, shrubs, mature trees)

Upland Species:	*Bank Species:*	*Emergent Species:*
same as grassland dominants + snowberry + rose + poison oak	currant ↓ RIBCAL poison oak → fern → snowberry Q. kellogii CA. Bay Q. agrifolia Q. gar.	CYNECH trifolium sp Laurel

OHWM DATA SHEET

Condition/Disturbances (e.g., erosion, grazing, culverts, etc.):

downed logs + overhanging banks / some evidence of scour present on both banks.

Hydrology:

- ☐ Flowing water
- ☐ Standing water
- ☐ Saturated
- ☑ Dry

Avg. depth:

Temp:

Min. depth:

Max. depth:

Checklist of resources (if available):

☐ Aerial photography	☐ Vegetation maps	☐ GPS unit
☐ Remotely-sensed images	☐ Soil maps	☐ Stream gage data
☐ Topographic maps	☐ Rainfall/precipitation data	☐ Other studies:
☐ Geologic maps	☐ Existing delineation(s) for site	

Other drawings (plan view), notes:

NA

Other forms related to this feature: ☐ Yes ☑ No

- ☐ Terrace, fringe, or floodplain wetland (wetland datasheet)
- ☐ Low flow channel or other representative section (OHWM datasheet)

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Fairfield Osborn Preserve (FOP) City/County: Sonoma Sampling Date: 12/29/2020

Applicant/Owner: CSU Sonoma State: CA Sampling Point: 1

Investigator(s): A. Sennett Section, Township, Range: see report

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): C Lat: 38.343820 Long: -122.594515 Datum: WGS 84

Soil Map Unit Name: Goulding cobbly clay loam, 15-30% slopes (GIE) NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	**Is the Sampled Area within a Wetland?** Yes _____ No ✓
Hydric Soil Present?	Yes ✓	No _____	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks:
Terrace on northwest side of seasonal drainage / upstream of pedestrian bridge.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Cynosurus echinatus	50	Yes	NL
2. Vicia sp.	3	No	FACU-NL
3. Geranium molle	5	No	FACU
4. Festuca perennis	10	No	FAC
5. Deschampsia elongata	10	No	FACW
6. Galium aparine	2	No	FACU
7. Elymus glaucus	10	No	FACU
8.			
Total Cover:	90		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 10 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5 2.5/1	100						clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ✓ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: clay

Depth (inches): 6

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ___ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: FOP City/County: Sonoma Sampling Date: 12/29/2020

Applicant/Owner: CSUS State: CA Sampling Point: 2

Investigator(s): A. Sennett Section, Township, Range: See report

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): Concave Slope (%): 0.5

Subregion (LRR): C Lat: 38.344713 Long: -122.594300 Datum: WGS 84

Soil Map Unit Name: GIE NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓ No ____	**Is the Sampled Area within a Wetland?** Yes ✓ No ____
Hydric Soil Present?	Yes ✓ No ____	
Wetland Hydrology Present?	Yes ✓ No ____	

Remarks: Seasonal wetland north of parking lot

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Rumex acetosella	10	No	FACU
2. Festuca perennis	20	Yes	FAC
3. Cynosurus echinatus	10	No	NL
4. Elymus caput-medusae	5	No	NL
5. Polypogon monospelensis	15	Yes	FACW
6. Juncus sp.	10	No	varies
7. Epilobium ciliatum	2.5	No	FACW
8.			
Total Cover:	72.5		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

✓ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	90	7.5YR 4/6	10	C	PL	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: clay

Depth (inches): 6

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Plowed Soils (C6)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Thin Muck Surface (C7)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

collects run-off from adjacent hillside overflow. In this feature likely conveys the other wetland to NE.

overflow to ✓

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: FOP City/County: Sonoma Sampling Date: 12/29/2020
Applicant/Owner: CSUS State: CA Sampling Point: 3
Investigator(s): A. Sennett Section, Township, Range: see report
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): C Lat: 38.344698 Long: -122.594276 Datum: WGS 84
Soil Map Unit Name: GIE NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No _____ (If no, explain in Remarks.)
Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No _____
Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✓	Is the Sampled Area within a Wetland? Yes _____ No ✓
Hydric Soil Present?	Yes _____	No ✓	
Wetland Hydrology Present?	Yes _____	No ✓	

Remarks: upland next to seasonal wetland - 1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: _____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	_____ = Total Cover		
Sapling/Shrub Stratum (Plot size: _____)			
1.			
2.			
3.			
4.			
5.			
	_____ = Total Cover		
Herb Stratum (Plot size: 5m²)			
1. Cynosurus echinatus	25	Yes	NL
2. Elymus caput-medusae	25	Yes	NL
3. Bromus hordeaceus	10	No	FACU
4. Epilobium ciliatum	3	No	FACW
5.			
6.			
7.			
8.			
	63 = Total Cover		
Woody Vine Stratum (Plot size: _____)			
1.			
2.			
	_____ = Total Cover		

% Bare Ground in Herb Stratum 37 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✓

Remarks:

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-4	7.5 YR 3/2	100					Silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 6

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: FOP City/County: Sonoma Sampling Date: 12/29/2020
Applicant/Owner: CSUS State: CA Sampling Point: 4
Investigator(s): A. Sennett Section, Township, Range: see report
Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 6
Subregion (LRR): C Lat: 38.344879 Long: -122.593758 Datum: WGS 84
Soil Map Unit Name: GIE NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✓	No ____	Is the Sampled Area within a Wetland? Yes ✓ No ____
Hydric Soil Present?	Yes ✓	No ____	
Wetland Hydrology Present?	Yes ✓	No ____	

Remarks:
seasonal wetland (#2) located NE of seasonal wetland-1.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5 m²)			
1. Lythrum hyssopifolia	30	yes	OBL
2. Eleocharis macrostachya	15	NO	OBL
3. Festuca perennis.	20	Yes	FAC
4. Mentha pulegium	20	Yes	OBL
5. Rumex pulchar	5	NO	FAC
6. Polypogon monospelensis	5	NO	FACW
7.			
8.			
	95 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 5 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: (A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
✓ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	7.5 YR 3/1	95	7.5 YR 2.5/1	5	C	PL	silty clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ✓ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ✓ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 6

Hydric Soil Present? Yes ✓ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ✓ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ✓ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: FOP City/County: Sonoma Sampling Date: 12/29/2020
Applicant/Owner: CSUS State: CA Sampling Point: 5
Investigator(s): A. Sennett Section, Township, Range: See report
Landform (hillslope, terrace, etc.): hill slope Local relief (concave, convex, none): none Slope (%): 0
Subregion (LRR): C Lat: 38.344840 Long: -122.593736 Datum: WGS 84
Soil Map Unit Name: GIE NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ✓	Is the Sampled Area within a Wetland? Yes ____ No ✓
Hydric Soil Present?	Yes ____ No ✓	
Wetland Hydrology Present?	Yes ____ No ✓	

Remarks: upland next to/ seasonal wetland - 2. South of

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ = Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ = Total Cover		
Herb Stratum (Plot size: 5m²)			
1. Cynosurus echinatus	20	Yes	NL
2. Elymus caput-medusae	20	Yes	NL
3. Bromus hordeaceus	10	No	FACU
4. Festuca perennis	10	No	FAC
5. Juncus tenuis	5	No	FACW
6.			
7.			
8.			
	65 = Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 35 % Cover of Biotic Crust 0

Dominance Test worksheet:
Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)
Total Number of Dominant Species Across All Strata: 2 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:
___ Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-6	7.5YR 3/2	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: clay

Depth (inches): 6

Hydric Soil Present? Yes ____ No ✓

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ____ No ✓ Depth (inches): ____

Water Table Present? Yes ____ No ✓ Depth (inches): ____

Saturation Present? (includes capillary fringe) Yes ____ No ✓ Depth (inches): ____

Wetland Hydrology Present? Yes ____ No ✓

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Attachment C

Aquatic Resources Spreadsheet

Waters Name	State	Cowardin Code	HGM Code	Meas Type	Amount	Units	Waters Type	Latitude	Longitude	Local Waterway
Seasonal Wetland 1	CALIFORNIA	PEM	DEPRESS	Area		ACRE	ISOLATE	38.344714	-122.594298	N/A
Seasonal Wetland 2	CALIFORNIA	PEM	DEPRESS	Area		ACRE	ISOLATE	38.344877	-122.593757	N/A
Seasonal Drainage	CALIFORNIA	R4	RIVERINE	Linear		FOOT	NRPW	38.343678	-122.594673	Copeland Creek

Appendix C

Cultural Resources Report CONFIDENTIAL

Appendix D
Geotechnical Report

RGH CONSULTANTS

Experience is the difference

GEOTECHNICAL STUDY REPORT

FAIRFIELD OSBORN PRESERVE IMPROVEMENTS
LICHAU ROAD
PENNGROVE, CALIFORNIA

Project Number:

1323.08.PW.1

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February 7, 2020

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INTRODUCTION

This report presents the results of our geotechnical study for the improvements to be constructed at the Fairfield Osborn Preserve on Lichau Road in Penngrove, California. The property extends over relatively level to moderately sloping terrain and contains hiking trails, a parking area, a storage shed, and an education center. The site location is shown on Plate 1, Appendix A.

We understand the proposed improvements include a new driveway off Lichau Road, a new parking lot with retaining walls, and improvements around the existing preserve structure. Depending on the grades, the driveway and parking lot will be gravel paved, have a double chip seal coat, or an asphalt surface. The handicap parking stalls and the stalls for clean, van, and electric vehicles will be asphalt paved. A bus stop will also be provided. Retaining walls will be needed around portions of the edges of the parking lot. The improvements around the existing structure will include a new pathway from the driveway/parking lot that includes a pedestrian bridge; a seating area and trellis on the eastern side of the structure; and a deck, talking circles, and screening partition on the western side.

Actual foundation loads are not known at this time. We anticipate the loads will be typical for the light type of construction planned. Grading plans are not available, but we anticipate that the planned grading will be the minimum amount needed to construct a level building pad and provide the building site and paved areas with positive drainage.

SCOPE

The purpose of our study, as outlined in our Service Agreement dated December 6, 2019, was to generate geotechnical information for the design and construction of the project. Our scope of services included reviewing selected published geologic data pertinent to the site; evaluating the subsurface conditions with borings and laboratory tests; analyzing the field and laboratory data; and presenting this report with the following geotechnical information:

1. A brief description of the soil, bedrock, and groundwater conditions observed during our study;

2. A discussion of seismic hazards that may affect the proposed improvements; and

3. Conclusions and recommendations regarding:

    a. Primary geotechnical engineering concerns and mitigating measures, as applicable;

    b. Site preparation and grading including remedial grading of weak, porous, compressible and/or expansive surface soil;

    c. Foundation types, design criteria, and estimated settlement behavior;

    d. Lateral loads for retaining wall design;

    e. Support of concrete slabs-on-grade;

f. Preliminary pavement thickness based on our experience with similar soil and projects and the results of an R-value test on the anticipated subgrade soil;

g. Utility trench backfill;

h. Geotechnical engineering drainage improvements; and

i. Supplemental geotechnical engineering services.

STUDY

Site Exploration

We reviewed our previous geotechnical studies in the vicinity and selected geologic references pertinent to the site. The geologic literature reviewed is listed in Appendix B. On January 13, 2020, we performed a geotechnical reconnaissance of the site and explored the subsurface conditions by drilling six borings to depths ranging from about 6¾ to 11½ feet. Additionally, we explored the subsurface conditions along the driveway alignment, including the entrance off Lichau Road, by drilling two borings to depths ranging from 3 to 4 feet. The borings were drilled with a portable drill rig equipped with 4-inch diameter, solid stem augers at the approximate locations shown on the Exploration Plan, Plates 2a and 2b. The boring locations were determined approximately by pacing their distance from features shown on the Exploration Plan and should be considered accurate only to the degree implied by the method used. Our staff engineer located and logged the borings and obtained samples of the materials encountered for visual examination, classification and laboratory testing.

Relatively undisturbed samples were obtained from the borings at selected intervals by driving a 2.43-inch inside diameter, split spoon sampler, containing 6-inch long brass liners, using a 140-pound hammer dropping approximately 30 inches. The sampler was driven 12 to 18 inches. The blows required to drive each 6-inch increment were recorded and the blows required to drive the last 12 inches, or portion thereof, were converted to equivalent Standard Penetration Test (SPT) blow counts using a conversion factor for correlation with empirical data. Disturbed samples were also obtained at selected depths by driving a 1.375-inch inside diameter (2-inch outside diameter) SPT sampler, without liners or rings, using a 140-pound hammer dropping approximately 30 inches. The sampler was driven 12 to 18 inches, the blows to drive each 6-inch increment were recorded, and the blows required to drive the final 12 inches, or portion thereof, are provided on the boring logs. A disturbed “bulk” sample was also obtained of the anticipated subgrade soil the borings and placed a bucket.

The logs of the borings showing the materials encountered, groundwater conditions, converted blow counts, and sample depths are presented on Plates 3 through 10. The soil is described in accordance with the Unified Soil Classification System, outlined on Plate 11. Bedrock is described in accordance with Engineering Geology Rock Terms, shown on Plate 12.

The boring logs show our interpretation of the subsurface soil, bedrock, and groundwater conditions on the date and at the locations indicated. Subsurface conditions may vary at other locations and times. Our interpretation is based on visual inspection of soil and bedrock samples, laboratory test results, and

interpretation of drilling and sampling resistance. The location of the soil and bedrock boundaries should be considered approximate. The transition between soil and bedrock types may be gradual.

Laboratory Testing

The samples obtained from the borings were transported to our office and re-examined to verify soil classifications, evaluate characteristics, and assign tests pertinent to our analysis. Selected samples were laboratory tested to determine their water content, dry density, classification (Atterberg Limits, percent of silt and clay), shear strength, expansion potential (Expansion Index - EI) and R-value. The test results are presented and referenced on the boring logs. Results of the classification, triaxial strength, and R-value tests are presented on Plates 13 through 19.

Infiltration Testing

We obtained an infiltration rate in a separate hole adjacent to boring B-5. We understand that typical design of infiltration systems requires water to infiltrate into the ground at a depth of about 3 feet below the existing ground surface. Therefore, our infiltration tests consisted of extending a 2-inch diameter PVC pipe to a depth of about 3 feet. The pipe was sealed around the bottom so that water could not flow up the sides of the pipe. Water was then poured into the pipe and allowed to infiltrate for about 1 hour and 25 minutes. We then measured the volume of water that had infiltrated. Based on the results of the infiltration test, we estimate that the infiltration rate of the near surface soil is 3.56 $x10^{-4}$ cubic centimeters per second.

SITE CONDITIONS

General

Sonoma County is located within the California Coast Range geomorphic province. This province is a geologically complex and seismically active region characterized by sub-parallel northwest-trending faults, mountain ranges, and valleys. The oldest bedrock units are the Jurassic-Cretaceous Franciscan Complex and Great Valley sequence sediments originally deposited in a marine environment. Subsequently, younger rocks such as the Tertiary-age Sonoma Volcanics group, the Plio-Pleistocene-age Clear Lake Volcanics, and sedimentary rocks such as the Guinda, Domengine, Petaluma, Wilson Grove, Cache, Huichica, and Glen Ellen formations were deposited throughout the province. Extensive folding and thrust faulting during late Cretaceous through early Tertiary geologic time created complex geologic conditions that underlie the highly varied topography of today. In valleys, the bedrock is covered by thick alluvial soil.

Geology

Published geologic maps (Wagner et al., 2003) indicate the property is underlain by landslides (Qls). The landslides are shown to comprise debris flow and block slump landslides.

Landslides

Published landslide maps (Dwyer et al., 1976) indicate the site is located in an area of probable landslide deposits. We did not observe active landslides at the site during our study.

Surface

The property extends primarily over relatively level to moderately sloping terrain. The vegetation consists of seasonal grasses and mature trees. The building site is located to the east of Lichau Road and includes the driveway, parking lot, walkway bridge, and the perimeter of the existing building. In general, the ground surface is soft and spongy. This is a condition generally associated with weak, porous surface soil. Natural drainage consists of sheet flow over the ground surface that concentrates in man made surface drainage elements such as roadside ditches, canals and gutters, and natural drainage elements such as swales, ravines, and creeks.

Subsurface

Our borings and laboratory tests indicate that the portion of the site we studied is blanketed by 3½ to 5½ feet of silt or clay that is weak, porous, and compressible in the upper 1 to 2 feet. Porous soil appears hard and strong when dry but becomes weak and compressible as its moisture content increases towards saturation. These soils exhibit medium to high plasticity (LL = 49.3 – 68.7; PI = 28.7 – 45.4) and medium to very high expansion potential (EI = 75 – 162). These surface materials are underlain by landslide debris consisting of very stiff sandy clay with gravel and cobble and andesite bedrock blocks. The andesite is generally weak, firm, and moderately weathered. A detailed description of the subsurface conditions found in our borings is given on Plates 3 through 10, Appendix A. Based on Table 20.3-1 of American Society of Civil Engineers (ASCE) Standard 7-16, titled “Minimum Design Loads and Associated Criteria for Buildings and Other Structures” (2017), we have determined a Site Class of C should be used for the site.

Corrosion Potential

Mapping by the Natural Resources Conservation Service (2020) indicates that the corrosion potential of the near surface soil is moderate for uncoated steel and low for concrete. Results of corrosion tests on soil samples from our borings will be presented under separate cover.

Groundwater

Groundwater seeped into boring B-6 at about 4 feet below the ground surface at the time of drilling. When the boring was backfilled after drilling was completed, the water level had risen to a depth of about 1 foot. Groundwater was not encountered in any of our other borings On hillsides, rainwater typically percolates through the porous surface materials and migrates downslope in the form of seepage at the interface of the surface materials and stiffer soils and/or bedrock, and through fractures

in the bedrock. Fluctuations in the seepage rates typically occur due to variations in rainfall intensity, duration and other factors such as periodic irrigation.

DISCUSSION AND CONCLUSIONS

Seismic Hazards

Faulting and Seismicity

We did not observe landforms within the area that would indicate the presence of active faults and the site is not within a current Alquist-Priolo Earthquake Fault Zone (Bryant and Hart, 2007). Therefore, we believe the risk of fault rupture at the site is low. However, the site is within an area affected by strong seismic activity and future seismic shaking should be anticipated at the site. It will be necessary to design and construct the proposed improvements in strict adherence with current standards for earthquake-resistant construction.

Liquefaction

Liquefaction is a rapid loss of shear strength experienced in saturated, predominantly granular soil below the groundwater level during strong earthquake ground shaking due to an increase in pore water pressure. The occurrence of this phenomenon is dependent on many complex factors including the intensity and duration of ground shaking, particle size distribution and density of the soil.

The subsurface materials encountered in our borings consist of clays with varying amounts of sand and gravel and bedrock blocks. These materials are not susceptible to liquefaction. Therefore, the potential for liquefaction at the project site is low.

Densification

Densification is the settlement of loose, granular soil above the groundwater level due to earthquake shaking. Typically, granular soil that would be susceptible to liquefaction, if saturated, are susceptible to densification if not saturated. As discussed in the “Liquefaction” section, the soil at the site has a low potential for liquefaction. Therefore, we judge that there is a low potential for densification to impact improvements at the site.

Lurching

Seismic slope failure or lurching is a phenomenon that occurs during earthquakes when slopes or man-made embankments yield and displace in the unsupported direction. As discuss previously, the project site is located within a large landslide. Our borings encountered landslide debris. Landslide debris can be susceptible to lurching. It was not part of our requested and/or approved scope of services to evaluate the potential for movement of the large landslide. In the more immediate project area, the adjacent slopes are generally not steep and the landslide debris encountered in our borings is relatively strong materials. Therefore, we judge the potential for localized lurching to impact to the proposed

improvements at the site is low. However, some of these secondary earthquake effects are unpredictable as to location and extent, as evidenced by the 1989 Loma Prieta Earthquake.

Geotechnical Issues

General

Based on our study, we judge the proposed improvements can be built as planned, provided the recommendations presented in this report are incorporated into their design and construction. The primary geotechnical concerns during design and construction of the project are:

1. The presence of 1 to 2 feet of highly expansive, weak, porous, compressible, clayey surface soil;

2. The detrimental effects of uncontrolled surface runoff and groundwater seepage on the long-term satisfactory performance of the improvements; and

3. The strong ground shaking predicted to impact the site during the life of the project.

Weak, Porous Surface Soil

Weak, porous surface soil, such as that found at the site, appears hard and strong when dry but will lose strength rapidly and settle under the load of fills, foundations, slabs, and pavements as its moisture content increases and approaches saturation. The moisture content of this soil can increase as the result of rainfall, periodic irrigation or when the natural upward migration of water vapor through the soil is impeded by, and condenses under fills, foundations, slabs, and pavements. The detrimental effects of such movements can be reduced by strengthening the soil during grading. This can be achieved by excavating the weak soil and replacing it as properly compacted (engineered) fill. Alternatively, satisfactory foundation support could be obtained below the weak surface soil.

Expansive Soil - In addition, the surface soil is expansive. Expansive surface soil shrinks and swells as they lose and gain moisture throughout the yearly weather cycle. Near the surface, the resulting movements can heave and crack lightly loaded shallow foundations (spread footings) and slabs and pavements. The zone of significant moisture variation (active layer) is dependent on the expansion potential of the soil and the extent of the dry season. In the improvements area, the active layer is generally considered to be about 3 feet. Stable foundation support needs to be obtained below this layer.

Foundation Support - Satisfactory foundation support for proposed improvements (ridge abutments, retaining walls, trellis, etc.) can be obtained from deepened spread footings that bottom on firm, native soil at least 36 inches below lowest adjacent grade. Drilled piers are commonly used to reduce the impacts of expansive soils, but due to the presence of cobbles and boulders, we do not recommend using drilled piers.

Concrete Flatwork and Asphalt Pavements

Concrete flatwork and asphalt pavements will heave and crack as the expansive soil shrinks and swells through the yearly weather cycle. Concrete and pavement cracking and distress are typically concentrated along edges where moisture content variation is more prevalent within subgrade soil. Concrete and pavement performance can be improved and the incidence of repair can be reduced, but not eliminated, by covering the pre-swelled expansive soil with at least 12 inches of select fill (see "On-Site Soil Quality" section) prior to constructing the concrete flatwork or pavement areas.

Decomposed Granite Pathways and Gravel Driveway/Parking Areas

Decomposed granite pathways and gravel driveway and parking areas can be supported on 12 inches of engineered fill.

On-Site Soil Quality

All fill materials used in the upper 12 inches of driveway and pavement subgrade must be select, as subsequently described in "Recommendations." We anticipate that, with the exception of organic matter and of rocks or lumps larger than 6 inches in diameter, the excavated material will be suitable for re-use as general fill, but will not be suitable for use as select fill unless stabilized with lime.

Select Fill

The select fill can consist of approved import materials with low expansion potential or lime stabilized on-site clayey soil. Lime stabilized soil may prevent the growth of landscape vegetation due to the inherent elevated pH level of the soil. The geotechnical engineer must approve the use of import soil as select fill during grading.

Settlement

If spread footings are installed in accordance with the recommendations presented in this report, we estimate that post-construction differential settlements across structural elements will be about ½ inch.

Surface Drainage

Because of topography and location, the site will be impacted by surface runoff. Surface runoff typically sheet flows over the ground surface but can be concentrated by the planned site grading, landscaping, and drainage. The surface runoff can pond against structures and cause deeper than normal soil heave. Therefore, strict control of surface runoff is necessary to provide long-term satisfactory performance. It will be necessary to divert surface runoff around improvements, provide positive drainage away from structures. This can be achieved by conveying the runoff into man made drainage elements or natural swales that lead downgradient of the site.

RECOMMENDATIONS

Seismic Design

Seismic design parameters presented below are based on Section 1613 titled "Earthquake Loads" of the 2019 California Building Code (CBC). Based on Table 20.3-1 of American Society of Civil Engineers (ASCE) Standard 7-16, titled "Minimum Design Loads and Associated Criteria for Buildings and Other Structures" (2017), we have determined a Site Class of C should be used for the site. Using a site latitude and longitude of 38.3434°N and 122.5948°W, respectively, and the OSHPD Seismic Design Maps website (https://seismicmaps.org), we recommend that the following seismic design criteria be used for applicable structures at the site.

2019 CBC Seismic Criteria	
Spectral Response Parameter	**Acceleration (g)**
S_S (0.2 second period)	2.564
S_1 (1 second period)	0.983
S_{MS} (0.2 second period)	3.077
S_{M1} (1 second period)	1.376
S_{DS} (0.2 second period)	2.051
S_{D1} (1 second period)	0.917

Grading

Site Preparation

Areas to be developed should be cleared of vegetation and debris including that left by the removal of obsolete structures. Trees and shrubs that will not be part of the proposed development should be removed and their primary root systems grubbed. Cleared and grubbed material should be removed from the site and disposed of in accordance with County Health Department guidelines. We did not observe septic tanks, leach lines, or underground fuel tanks during our study. Any such appurtenances found during grading should be capped and sealed and/or excavated and removed from the site, respectively, in accordance with established guidelines and requirements of the County Health Department. Voids created during clearing should be backfilled with engineered fill as recommended herein.

Stripping

Areas to be graded should be stripped of the upper few inches of soil containing organic matter. Soil containing more than two percent by weight of organic matter should be considered organic. Actual stripping depth should be determined by a representative of the geotechnical engineer in the field at

the time of stripping. The strippings should be removed from the site, or if suitable, stockpiled for re-use as topsoil in landscaping.

Excavations

Following initial site preparation, excavation should be performed as recommended herein. Excavations extending below the proposed finished grade should be backfilled with suitable materials compacted to the requirements given below.

Within fill areas, the disturbed active layer and weak, porous, compressible, expansive surface soil should be excavated to within 6 inches of its entire depth (up to 2 feet in our borings). Within decomposed granite pathways and gravel driveway and parking areas, the weak and porous soils should be excavated to at least 12 inches below subgrade. The excavation of weak, compressible, expansive soil should also extend at least 12 inches below concrete flatwork and pavement subgrade to allow space for the installation of the select fill blanket discussed in the conclusions section of this report.

The excavation of weak, porous, compressible, expansive surface materials should extend at least 3 feet beyond the edge of decomposed granite pathways, gravel driveway, parking, concrete flatwork, and pavements. The excavated materials should be stockpiled for later use as compacted fill, or removed from the site, as applicable.

At all times, temporary construction excavations should conform to the regulations of the State of California, Department of Industrial Relations, Division of Industrial Safety or other stricter governing regulations. The stability of temporary cut slopes, such as those constructed during the installation of underground utilities, should be the responsibility of the contractor. Depending on the time of year when grading is performed, and the surface conditions exposed, temporary cut slopes may need to be excavated to 1½:1, or flatter. The tops of the temporary cut slopes should be rounded back to 2:1 in weak soil zones.

Subsurface Drainage

A subdrain should be installed where evidence of seepage is observed. The subdrain should consist of a 4-inch diameter (minimum) perforated plastic pipe with SDR 35 or better embedded in Class 2 permeable material. The permeable material should be at least 12 inches thick and extend at least 12 inches above and below the seepage zone.

In addition, subdrains should be installed at a minimum slope of 1 percent and should have cleanouts located at their ends and at turning points. “Sweep” type elbows and wyes should be used at all turning points and cleanouts, respectively. Subdrain outlets and riser cleanouts should be fabricated of the same material as the subdrain pipe as specified herein. Outlet and riser pipe fittings should not be perforated. A licensed land surveyor or civil engineer should provide “record drawings” depicting the locations of subdrains and cleanouts.

Fill Quality

All fill materials should be free of perishable matter and rocks or lumps over 6 inches in diameter and must be approved by the geotechnical engineer prior to use. The upper 12 inches of fill beneath and

within 3 feet of concrete flatwork and pavement edges should be select fill. We judge the on-site soil is generally suitable for use as general fill but will not be suitable for use as select fill unless they are stabilized with lime. Lime stabilized soil may prevent the growth of landscape vegetation due to the inherent elevated pH level of the soil. The suitability of the on-site soil for use as select fill should be verified during grading.

Select Fill

Select fill should be free of organic matter, have a low expansion potential, and conform in general to the following requirements:

SIEVE SIZE	PERCENT PASSING (by dry weight)
6 inch	100
4 inch	90 – 100
No. 200	10 – 60

Liquid Limit – 40 Percent Maximum
Plasticity Index – 15 Percent Maximum
R-value – 20 Minimum (pavement areas only)

Expansive on-site soil may be used as select fill if it is stabilized with lime. In general, imported fill, if needed, should be select. Material not conforming to these requirements may be suitable for use as import fill; however, it shall be the contractor's responsibility to demonstrate that the proposed material will perform in an equivalent manner. The geotechnical engineer should approve imported materials prior to use as compacted fill. The grading contractor is responsible for submitting, at least 72 hours (3 days) in advance of its intended use, samples of the proposed import materials for laboratory testing and approval by the soils engineer.

Lime Stabilization

For preliminary planning purposes, we estimate that high calcium lime mixed at a minimum of 5½ percent (dry weight) will stabilize the expansive site soil. This percentage of lime needs to be verified prior to construction with engineering analysis and laboratory Atterberg Limits and/or pH testing using lime from the same source as that planned for use on the project and a sample of the soil to be treated. Laboratory test results and engineering analysis may indicate that a higher percentage of lime is required. The contractor should allow a minimum of 5 business days for the laboratory tests to be completed.

The lime stabilization should be performed in accordance with Section 24 of the Caltrans Standard Specifications except that a curing seal will not be required, provided the moisture content of the lime-stabilized material is maintained at or above optimum moisture content until it is permanently covered with subsequent construction. Lime stabilized materials are generally not suitable for reuse as general fill, select fill or backfill after compaction has taken place.

Fill Placement

The surface exposed by stripping and removal of weak, compressible, expansive surface soil should be scarified to a depth of at least 6 inches, uniformly moisture-conditioned to at least 4 percent above optimum and compacted to at least 90 percent of the maximum dry density of the materials as determined by ASTM Test Method D-1557. In expansive soil areas, moisture conditioning should be sufficient to completely close all shrinkage cracks for their full depth. If grading is performed during the dry season, the shrinkage cracks may extend to a few feet below the surface. Therefore, it may be necessary to excavate a portion of the cracked soil to obtain the proper moisture condition and degree of compaction. Approved fill material should then be spread in thin lifts, uniformly moisture-conditioned to near optimum and properly compacted. All structural fills, including those placed to establish site surface drainage, should be compacted to at least 90 percent relative compaction. Expansive soil used as fill should be moisture-conditioned to at least 4 percent above optimum. Only approved select materials should be used for fill within the upper 12 inches of concrete flatwork and pavement subgrades.

SUMMARY OF COMPACTION RECOMMENDATIONS

Area	Compaction Recommendation (ASTM D-1557)
Preparation for areas to receive fill	After preparation in accordance with this report, compact upper 6 inches to a minimum of 90 percent relative compaction.
General fill (native or import)	Compact to a minimum of 90 percent relative compaction.
Structural fill beneath buildings, extending outward to 5' beyond building perimeter	Compact to a minimum of 90 percent relative compaction.
Trenches	Compact to a minimum of 90 percent relative compaction. Compact the top 6 inches below vehicle pavement subgrade to a minimum of 95 percent relative compaction.
Retaining wall backfill	Compact to a minimum of 90 percent relative compaction, but not more than 95 percent.
Pavements, extending outward to 3' beyond edge of pavement	Compact upper 6 inches of subgrade to a minimum of 95 percent relative compaction.

SUMMARY OF COMPACTION RECOMMENDATIONS	
Area	Compaction Recommendation (ASTM D-1557)
Concrete flatwork and exterior slabs, extending outward to 3' beyond edge of slab	Compact subgrade to a minimum of 90 percent relative compaction. Where subject to vehicle traffic, compact upper 6 inches of subgrade to at least 95 percent relative compaction.
Aggregate Base	Compact aggregate base to at least 95 percent relative compaction.

Permanent Cut and Fill Slopes

In general, cut and fill slopes should be designed and constructed at slope gradients of 3:1 (horizontal to vertical) or flatter, unless otherwise approved by the geotechnical engineer in specified areas. Where steeper slopes are required, retaining walls should be used. Fill slopes should be constructed by overfilling and cutting the slope to final grade. “Track walking” of a slope to achieve slope compaction is not an acceptable procedure for slope construction. The geotechnical engineer is not responsible for measuring the angles of these slopes.

Wet Weather Grading

Generally, grading is performed more economically during the summer months when the on-site soil is usually dry of optimum moisture content. Delays should be anticipated in site grading performed during the rainy season or early spring due to excessive moisture in on-site soil. Special and relatively expensive construction procedures, including dewatering of excavations and importing granular soil, should be anticipated if grading must be completed during the winter and early spring or if localized areas of soft saturated soil are found during grading in the summer and fall.

Open excavations also tend to be more unstable during wet weather as groundwater seeps towards the exposed cut slope. Severe sloughing and occasional slope failures should be anticipated. The occurrence of these events will require extensive clean up and the installation of slope protection measures, thus delaying projects. The general contractor is responsible for the performance, maintenance and repair of temporary cut slopes.

Foundation Support

Because of the presence of expansive surface soil, the improvements should be supported on deepened spread footings that gain support below the zone of significant moisture variation. Normally, drilled piers would be an additional option. However, we encountered cobbles, boulders, and difficult drilling conditions during our exploration. Therefore, we do not recommend drilled piers as a foundation option.

Spread Footings

Spread footings should be at least 12 inches wide and should bottom on firm, native soil at least 36 inches below lowest adjacent grade. Additional embedment or width may be needed to satisfy code and/or structural requirements. On ungraded sloping terrain, the footings for the bridge should be stepped as necessary to produce level tops and bottoms. Footings should be deepened as necessary to provide at least 7 feet of horizontal confinement between the footing bottoms and the face of the nearest slope.

The bottoms of all footing excavations should be thoroughly cleaned out or wetted and compacted using hand-operated tamping equipment prior to placing steel and concrete. This will remove the soil disturbed during footing excavations, restore their adequate bearing capacity, and reduce post-construction settlements. Footing excavations should not be allowed to dry before placing concrete. If shrinkage cracks appear in soil exposed in the footing excavations, the soil should be thoroughly moistened to close all cracks prior to concrete placement. The moisture condition of the foundation excavations should be checked by the geotechnical engineer no more than 24 hours prior to placing concrete.

Bearing Pressures - Footings installed in accordance with these recommendations may be designed using allowable bearing pressures of 2,000, 3,000, and 4,000 pounds per square foot (psf), for dead loads, dead plus code live loads, and total loads (including wind and seismic), respectively.

Lateral Pressures - The portion of spread footing foundations extending into firm natural soil may impose a passive equivalent fluid pressure and a friction factor of 300 pounds per cubic foot (pcf) and 0.30, respectively, to resist sliding. Passive pressure should be reduced to 150 pcf for ungraded near surface soil. Passive pressure should be neglected within the upper 12 inches, unless the soil is confined by concrete slabs or pavements.

Retaining Walls

Retaining walls constructed at the site must be designed to resist lateral earth pressures plus additional lateral pressures that may be caused by surcharge loads applied at the ground surface behind the walls. Retaining walls free to rotate (yielding greater than 0.1 percent of the wall height at the top of the backfill) should be designed for active lateral earth pressures. If walls are restrained by rigid elements to prevent rotation, they should be designed for “at rest” lateral earth pressures.

Retaining walls should be designed to resist the following earth equivalent fluid pressures (triangular distribution):

EARTH EQUIVALENT FLUID PRESSURES		
Loading Condition	**Pressure (pcf)**	**Additional Seismic Pressure (pcf)***
Active - Level Backfill	42	26
Active - Sloping Backfill 3:1 or Flatter	53	64
At Rest - Level Backfill	63	89

* If required

These pressures do not consider additional loads resulting from adjacent foundations or other loads. If these additional surcharge loadings are anticipated, we can assist in evaluating their effects. Where retaining wall backfill is subject to vehicular traffic, the walls should be designed to resist an additional surcharge pressure equivalent to two feet of additional backfill.

Retaining walls will yield slightly during backfilling. Therefore, walls should be backfilled prior to building on, or adjacent to, the walls. Backfill against retaining walls should be compacted to at least 90 and not more than 95 percent relative compaction. Over-compaction or the use of large compaction equipment should be avoided because increased compactive effort can result in lateral pressures higher than those recommended above.

Foundation Support

Retaining walls should be supported on spread footings designed in accordance with the recommendations presented in this report. Retaining wall foundations should be designed by the project civil or structural engineer to resist the lateral forces set forth in this section.

Wall Drainage and Backfill

Retaining walls should be backdrained as shown on Plate 20, Appendix A. The backdrains should consist of 4-inch diameter, rigid perforated pipe embedded in Class 2 permeable material. The pipe should be PVC Schedule 40 or ABS with SDR 35 or better, and the pipe should be sloped to drain to outlets by gravity. The top of the pipe should be at least 8 inches below lowest adjacent grade. The Class 2 permeable material should extend to within 1½ feet of the surface. The upper 1½ feet should be backfilled with compacted soil to exclude surface water. Expansive soil should not be used for wall backfill. Where expansive soil is present in the excavation made to install the retaining wall, the excavation should be sloped back 1:1 from the back of the footing or grade beam. The ground surface behind retaining walls should be sloped to drain. Where migration of moisture through retaining walls would be detrimental, retaining walls should be waterproofed.

Slab-On-Grade

Provided grading is performed in accordance with the recommendations presented herein, slabs should be underlain by at least 12 inches of select fill. Slabs subject to vehicular traffic can be designed using a modulus of subgrade reaction of 80 pounds per cubic inch (pci).

Slab-on-grade subgrade should be rolled to produce a dense, uniform surface. The future expansion potential of the subgrade soil should be reduced by thoroughly presoaking the slab subgrade prior to concrete placement. The moisture condition of the subgrade soil should be checked by the geotechnical engineer no more than 24 hours prior to placing the capillary moisture break. The slabs should be underlain with a capillary moisture break consisting of at least 4 inches of clean, free-draining crushed rock or gravel (excluding pea gravel) at least ¼-inch and no larger than ¾-inch in size. Slabs subject to vehicular traffic may be underlain by Class 2 aggregate base. The use of Class 2 aggregate base should be reviewed on a case by case basis. Class 2 aggregate base can be used for slab rock under exterior slabs.

Slabs should be designed by the project civil or structural engineer to support the anticipated loads, reduce cracking and provide protection against the infiltration of moisture vapor. A vapor barrier should be placed under all slabs-on-grade that are likely to receive an impermeable floor finish or be used for any purpose where the passage of water vapor through the floor is undesirable. RGH does not practice in the field of moisture vapor transmission evaluation or mitigation. Therefore, we recommend that a qualified person be consulted to evaluate the general and specific moisture vapor transmission paths and any impact on the proposed construction. This person should provide recommendations for mitigation of the potential adverse impact of moisture vapor transmission on various components of the structure as deemed appropriate.

Decomposed Granite

Provided grading is performed in accordance with the recommendations presented herein, the decomposed granite for the talking circle and other areas should be underlain by 12 inches of select fill. The decomposed granite section should consist of a minimum of 3 inches of decomposed granite over at least 4 inches of Class 2 Aggregate Base. Because of the moderate to very high expansion potential of the soil at the site and the difficulty in controlling seasonal moisture variation beneath and adjacent to the talking circle and pathways cracking may develop in the decomposed granite surface. Adding select fill or increasing aggregate base thickness or installing moisture cutoffs may reduce but not eliminate the potential for cracks to develop. It should be understood that the decomposed granite surface will likely require regular maintenance.

Utility Trenches

The shoring and safety of trench excavations is solely the responsibility of the contractor. Attention is drawn to the State of California Safety Orders dealing with “Excavations and Trenches.”

Unless otherwise specified by the County of Sonoma, on-site, inorganic soil may be used as utility trench backfill. Where utility trenches support pavements, slabs and foundations, trench backfill should consist of aggregate baserock. The baserock should comply with the minimum requirements in Caltrans

Standard Specifications, Section 26 for Class 2 Aggregate Base. Trench backfill should be moisture-conditioned as necessary, and placed in horizontal layers not exceeding 8 inches in thickness, before compaction. Each layer should be compacted to at least 90 percent relative compaction as determined by ASTM Test Method D-1557. The top 6 inches of trench backfill below vehicle pavement subgrades should be moisture-conditioned as necessary and compacted to at least 95 percent relative compaction. Jetting or ponding of trench backfill to aid in achieving the recommended degree of compaction should not be attempted.

Pavements

We understand that the finished driveway and parking lot surface will consist of double chip seal or aggregate base/gravel. There is no established design procedure or known lifetime performance for these types of travel surfaces. Chip seal and aggregate base/gravel travel surfaces will require frequent maintenance and repair. Maintenance and repair could range from regrading washboard and filling in potholes or low areas with new material to completely repairing/reconstructing the section. The maintenance and repair process will be on-going through the life of the driveway and parking area. As there is no design procedure for these types of travel surfaces, we typically do not provide specific recommendations for the surface finish. For this project, we do recommend that the section include at least 15 inches of aggregate base. Recommendations for asphalt surfacing of the driveway and parking area are provided hereinafter.

Provided the site grading is performed to remediate expansive soil heave, as recommended herein, the uppermost 12-inches of pavement subgrade soil will be either imported select fill with a minimum R-value of 20 or lime stabilized site soil that generally has an R-value of at least 50. Based on those R-values we recommend the pavement sections listed in the tables below be used.

Because of the very high expansion potential of the soil at the site and the difficulty in controlling seasonal moisture variation beneath and adjacent to the driveway, significant cracking may develop in the pavement even if 12-inches of select fill is installed. Increasing the thickness of select fill or installing moisture cutoffs may reduce but not eliminate the potential for cracks to develop. It should be understood that pavements will likely require regular maintenance including crack sealing and the aesthetics may not be desirable.

PAVEMENT SECTIONS WITH IMPORTED SELECT FILL SUBGRADE			
TI	ASPHALT CONCRETE (feet)	CLASS 2 AGGREGATE BASE (feet)	IMPORTED SELECT FILL* (feet)
6.0	0.25	1.05	1.0
5.0	0.20	0.90	1.0

* R-value ≥ 20

PAVEMENT SECTIONS WITH LIME STABILIZED SELECT FILL SUBGRADE			
TI	ASPHALT CONCRETE (feet)	CLASS 2 AGGREGATE BASE (feet)	LIME STABILIZED SELECT FILL* (feet)
6.0	0.30	0.50	1.0
5.0	0.20	0.50	1.0

* R-value ≥ 50

Pavement thicknesses were computed using Caltrans design equations and are based on a pavement life of 20 years. These recommendations are intended to provide support for traffic represented by the indicated Traffic Indices. They are not intended to provide pavement sections for heavy concentrated construction storage or wheel loads such as forklifts, parked truck-trailers and concrete trucks or for post-construction concentrated wheel loads such as self-loading dumpster trucks.

In areas where heavy construction storage and wheel loads are anticipated (including the bus stop area), the pavements should be designed to support these loads. Support could be provided by increasing pavement sections or by providing reinforced concrete slabs. Alternatively, paving can be deferred until heavy construction storage and wheel loads are no longer present. Loading areas for self-loading dumpster trucks should be provided with reinforced concrete slabs at least 6 inches thick, and reinforced with No. 4 bars at 12-inch centers each way.

Prior to placement of aggregate base, the upper 6 inches of the pavement subgrade soil excluding lime stabilized soil should be scarified, uniformly moisture-conditioned to near optimum, and compacted to at least 95 percent relative compaction to form a firm, non-yielding surface. Lime stabilized select fill subgrade soil should be compacted as specified in Section 24 of the Caltrans Standard Specifications.

Aggregate base materials should be spread in thin layers, uniformly moisture-conditioned, and compacted to at least 95 percent relative compaction to form a firm, non-yielding surface. The materials and methods used should conform to the requirements of the County of Sonoma and the current edition of the Caltrans Standard Specifications, except that compaction requirements should be based on ASTM Test Method D-1557. Aggregate used for the base course should comply with the minimum requirements specified in Caltrans Standard Specifications, Section 26 for Class 2 Aggregate Base.

Parking Lot Drainage

Water tends to migrate under pavements and collect in the aggregate courses at low areas on parking lot subgrade soil, such as around storm drain inlets and the thread of paved swales leading to inlets. The ponded water will soften subgrade soil and, under repetitive heavy-wheel loads, will induce inordinately high stresses on the subgrade and pavement components that could result in untimely maintenance. Under-pavement drainage can be improved and maintenance reduced by replacing a 12-inch wide strip (extending at least 15 feet on either side of the inlet) of the select subbase layer or subgrade soil with a subdrain consisting of ¾-inch or 1½-inch free-draining Class 1 Permeable Material. The drain rock should be outletted into the storm drain inlet. Storm drain trenches can be made to serve as pavement

subdrains. We should be consulted to verify the suitability of storm drain trenches as pavement subdrains in a case-specific basis.

Where pavements will abut landscaped areas, the pavement baserock layer and subgrade soil should be protected against saturation from irrigation and rainwater with a subdrain, similar to that previously discussed. The subdrain should extend to a depth of at least 6 inches below the bottom of the baserock layer. Alternatively, a grouted moisture cut-off that extends 12 inches below the bottom of the baserock layer should be provided below or immediately behind the curb and gutter.

Wet Weather Paving

In general, the pavements should be constructed during the dry season to avoid the saturation of the subgrade and base materials, which often occurs during the wet winter months. If pavements are constructed during the winter, a cost increase relative to drier weather construction should be anticipated. Unstable areas may have to be overexcavated to remove soft soil. The excavations will probably require backfilling with imported crushed (ballast) rock. The geotechnical engineer should be consulted for recommendations at the time of construction.

Geotechnical Drainage

Surface water should be diverted away from slopes, foundations and edges of pavements. Surface drainage gradients should slope away from building foundations in accordance with the requirements of the CBC or local governing agency. Where a gradient flatter than 2 percent for paved areas and 4 percent for unpaved areas is required to satisfy design constraints, area drains should be installed with a spacing no greater than about 20 feet.

Water seepage or the spread of extensive root systems into the soil subgrade of footings, slabs or pavements could cause differential movements and consequent distress in these structural elements. Landscaping should be planned with consideration for these potential problems.

Maintenance

Periodic land maintenance will be required. Surface and subsurface drainage facilities should be checked frequently, and cleaned and maintained as necessary or at least annually. A dense growth of deep-rooted ground cover must be maintained on all slopes to reduce sloughing and erosion. Sloughing and erosion that occurs must be repaired promptly before it can enlarge.

Supplemental Services

Pre-Bid Meeting

It has been our experience that contractors bidding on the project often contact us to discuss the geotechnical aspects. Informal contacts between RGH Consultants (RGH) and an individual contractor

could result in incomplete or misinterpreted information being provided to the contractor. Therefore, we recommend a pre-bid meeting be held to answer any questions about the report prior to submittal of bids. If this is not possible, questions or clarifications regarding this report should be directed to the project owner or their designated representative. After consultation with RGH, the project owner or their representative should provide clarifications or additional information to all contractors bidding the job.

Plan and Specifications Review

Coordination between the design team and the geotechnical engineer is recommended to assure that the design is compatible with the soil, geologic and groundwater conditions encountered during our study. RGH recommends that we be retained to review the project plans and specifications to determine if they are consistent with our recommendations. In the event we are not retained to perform this recommended review, we will assume no responsibility for misinterpretation of our recommendations.

Construction Observation and Testing

Prior to construction, a meeting should be held at the site that includes, but is not limited to, the owner or owner's representative, the general contractor, the grading contractor, the foundation contractor, the underground contractor, any specialty contractors, the project civil engineer, other members of the project design team and RGH. This meeting should serve as a time to discuss and answer questions regarding the recommendations presented herein and to establish the coordination procedure between the contractors and RGH.

In addition, we should be retained to monitor all soil related work during construction, including:

- Site stripping, over-excavation, grading, and compaction of near surface soil;
- Placement of all engineered fill and trench backfill with verification field and laboratory testing;
- Observation of all foundation excavations; and
- Observation of foundation and subdrain installations.

If, during construction, we observe subsurface conditions different from those encountered during the explorations, we should be allowed to amend our recommendations accordingly. If different conditions are observed by others, or appear to be present beneath excavations, RGH should be advised at once so that these conditions may be evaluated and our recommendations reviewed and updated, if warranted. The validity of recommendations made in this report is contingent upon our being notified and retained to review the changed conditions.

If more than 18 months have elapsed between the submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at, or adjacent to, the site, the recommendations made in this report may no longer be valid or appropriate. In such case, we recommend that we be retained to review this report and verify the applicability of the conclusions and recommendations or modify the same considering the time lapsed or changed conditions. The validity of recommendations made in this report is contingent upon such review.

These supplemental services are performed on an as-requested basis and are in addition to this geotechnical study. We cannot accept responsibility for items that we are not notified to observe or for changed conditions we are not allowed to review.

LIMITATIONS

This report has been prepared by RGH for the exclusive use of Sonoma State University and their consultants as an aid in the design and construction of the proposed improvements described in this report.

The validity of the recommendations contained in this report depends upon an adequate testing and monitoring program during the construction phase. Unless the construction monitoring and testing program is provided by our firm, we will not be held responsible for compliance with design recommendations presented in this report and other addendum submitted as part of this report.

Our services consist of professional opinions and conclusions developed in accordance with generally accepted geotechnical engineering principles and practices. We provide no warranty, either expressed or implied. Our conclusions and recommendations are based on the information provided to us regarding the proposed construction, the results of our field exploration, laboratory testing program, and professional judgment. Verification of our conclusions and recommendations is subject to our review of the project plans and specifications, and our observation of construction.

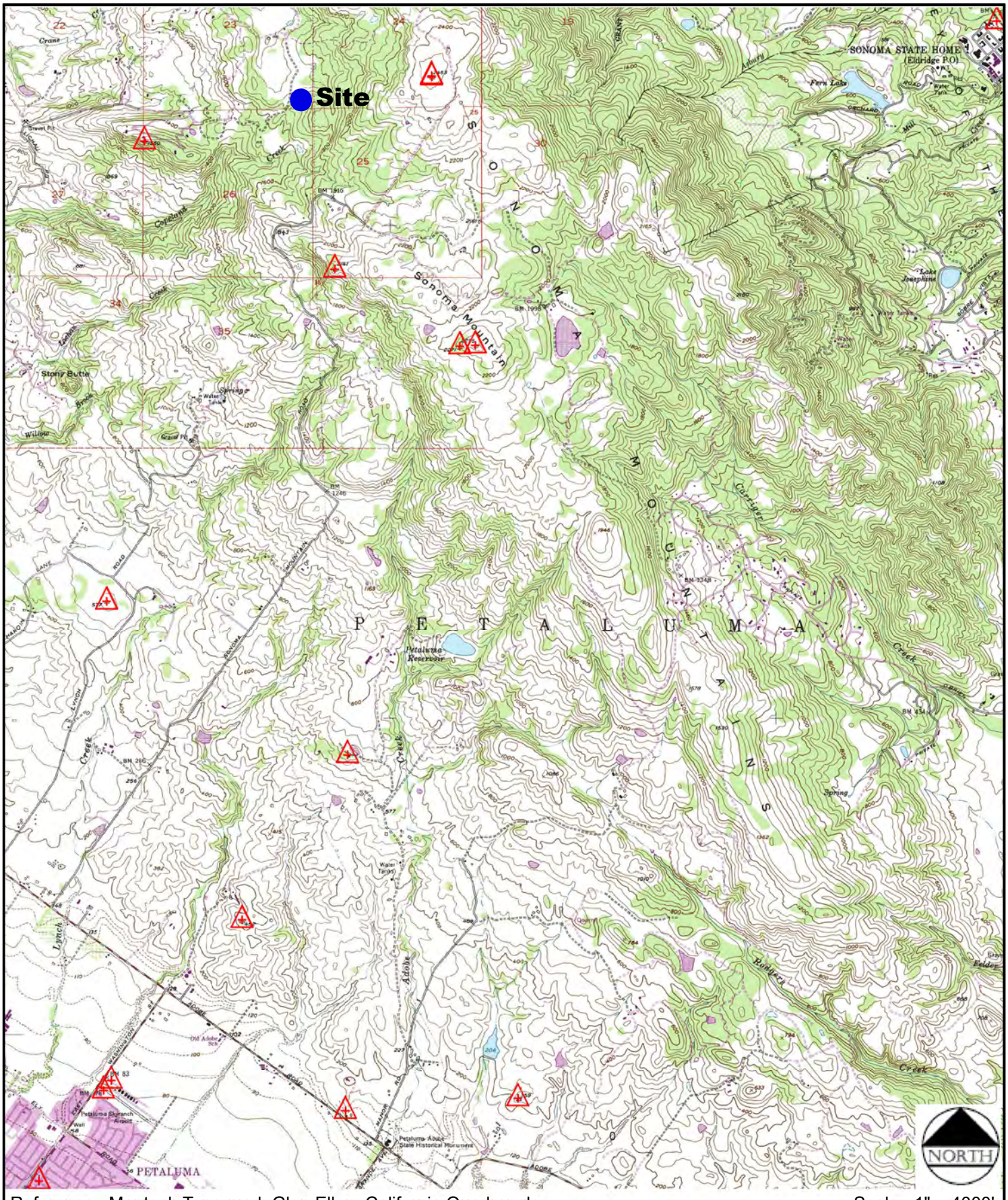
The borings represent the subsurface conditions at the locations and on the date indicated. It is not warranted that they are representative of such conditions elsewhere or at other times. Site conditions and cultural features described in the text of this report are those existing at the time of our field exploration and may not necessarily be the same or comparable at other times.

It should be understood that slope failures including landslides, debris flows and erosion are on-going natural processes which gradually wear away the landscape. Residual soil and weathered bedrock can be susceptible to downslope movement, even on apparently stable sites. Such inherent hillside and slope risks are generally more prevalent during periods of intense and prolonged rainfall, which occasionally occur, in northern California and/or during earthquakes. Therefore, it must be accepted that occasional, unpredictable slope failure and erosion and deposition of the residual soil and weathered bedrock materials are irreducible risks and hazards of building upon or near the base of any hillside or any steeper slope area throughout northern California. By accepting this report, the client and other recipients acknowledge their understanding and acceptance of these risks and hazards, and the terms and conditions herein.

The scope of our services did not include an environmental assessment or a study of the presence or absence of toxic mold and/or hazardous, toxic or corrosive materials in the soil, surface water, groundwater or air (on, below or around this site), nor did it include an evaluation or study for the presence or absence of wetlands. These studies should be conducted under separate cover, scope and fee and should be provided by a qualified expert in those fields.

APPENDIX A - PLATES

LIST OF PLATES



Reference: Maptech Topoquad, Glen Ellen, California Quadrangle

Scale: 1" = 4000'

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Job No: 1323.08.PW.1 | Date: FEB 2020

SITE LOCATION MAP
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
1

B-1

B-2

B-3

B-4

B-7

B-8

EXPLANATION

B-8 Boring Location and Number

20 0 20 feet

Scale: 1" = 20'

Reference: Topographic Survey, Sheet C1.2, by EBA Engineerings dated Nov. 2019

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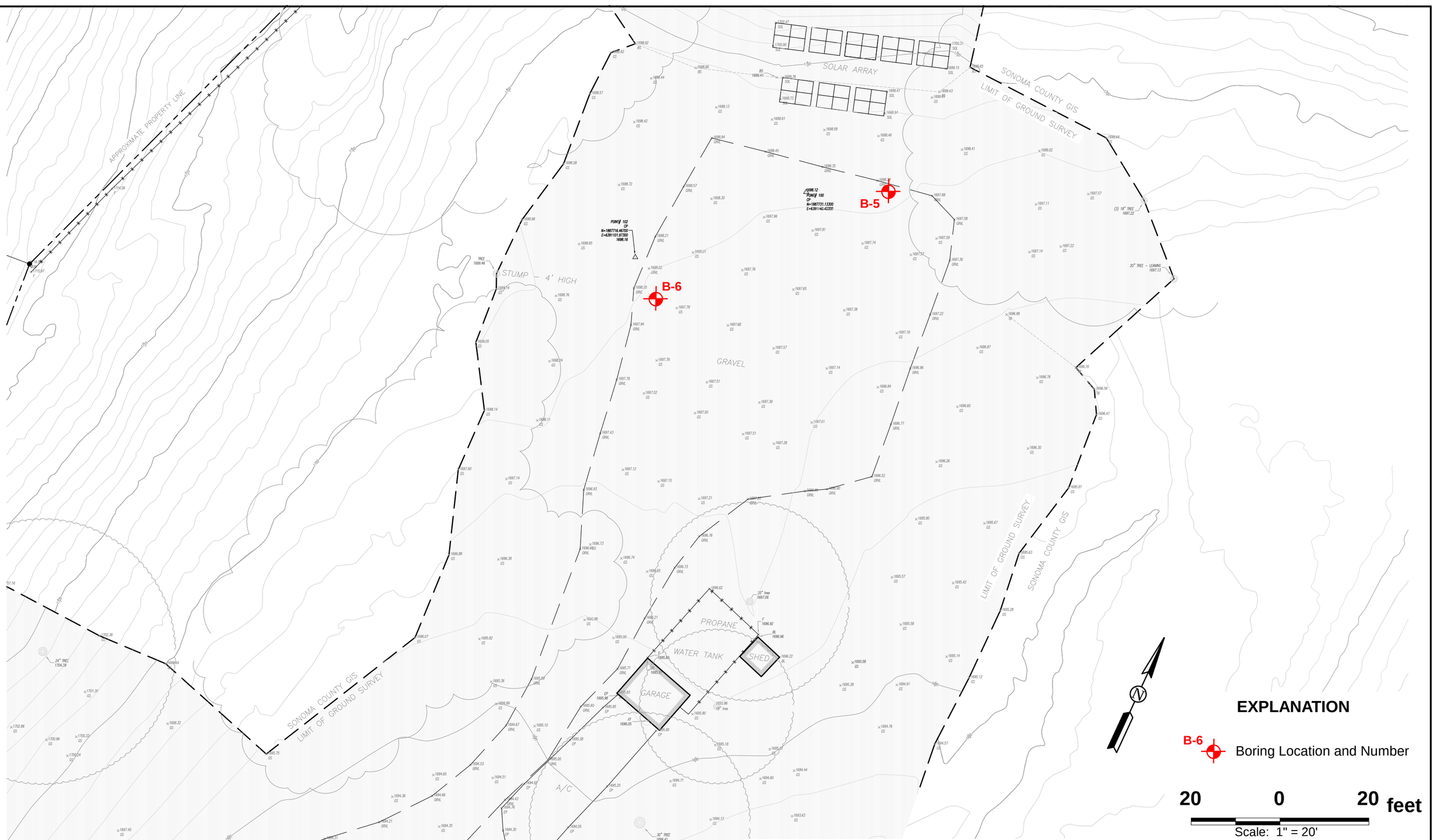
Job No: 1323.08.PW.1 Date: FEB 2020

EXPLORATION PLAN
Fairfield Osborn preserve Improvements
Lichau Road
Penngrove, California

PLATE
2a



Reference: Topographic Survey, Sheet C1.1 by EBA Engineering dated Nov. 2019

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Job No: 1323.08.P.1 Date: FEB 2020

EXPLORATION PLAN
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
2b

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **11 1/2 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN SANDY SILT (ML), medium stiff, moist to wet, weak and porous								
				LIGHT BROWN CLAY WITH SAND (CH), medium stiff, moist to wet				45.4	68.7	162		
		6			88.1	30.4						Su = 845.5 psf
5				GRAY BROWN SANDY CLAY WITH GRAVEL (CH), very stiff, moist, trace cobbles and boulders (Qls)								
		17			100.7	19.8						Su = 4792.5 psf
10		33		Boring terminated at 11 1/2 feet No groundwater encountered								
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-1
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE **3**

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **6 3/4 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN CLAY WITH SAND (CH), medium stiff to very stiff, moist, weak and porous to 1 1/2 feet, trace gravel				37.4	58.9	121		
		26										
				LIGHT GRAY BROWN SANDY CLAY WITH GRAVEL (CH), very stiff, moist, trace cobbles (Qls)								
5												
		50/3"		Boring terminated at 6 3/4 feet No groundwater encountered								
10												
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-2
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE **4**

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **8 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				RED BROWN SANDY CLAY (CH), medium stiff to stiff, moist, weak and porous to 1 1/2 feet, trace cobbles and boulders								
		50/6"										
				LIGHT GRAY ANDESITE, firm, weak, moderately weathered, (Qls)								
5		26										
				Boring terminated at 8 feet No groundwater encountered								
10												
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-3
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE **5**

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **11 1/2 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				BROWN SANDY CLAY (CH), stiff, moist, weak and porous to 2 feet, trace gravels and cobbles								
		10			98.1	23.5						
				LIGHT GRAY ANDESITE, weak, firm, moderately weathered, (Qls)								
5		36										
10		36		Boring terminated at 11 1/2 feet No groundwater encountered								
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-4
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
6

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **11 1/2 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN CLAY WITH SAND (CL), stiff, moist, trace gravel, weak and porous to 1 1/2 feet				28.7	49.3	75		
		10			96.9	24.8						Su = 1061.5 psf
5				GRAY BROWN SANDY CLAY WITH GRAVEL (CH), very stiff, moist, trace cobbles and boulders, (Qls)								
		17			101.5	24.0						Su = 1692.5 psf
10		22		Boring terminated at 11 1/2 feet No groundwater encountered								
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-5
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
7

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **10 1/2 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **4 feet**	Sampling Method(s) **Modified California, SPT**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN SANDY CLAY (CH), medium stiff, wet, weak and porous								
				DARK BROWN CLAY WITH SAND (CH), stiff, moist								
		12			85.6	33.8						Su = 1125.5 psf
				BROWN SANDY CLAY WITH GRAVEL (CH), very stiff, wet, trace cobbles, (Qls)								
5		14										
10		10										
				Boring terminated at 10 1/2 feet Groundwater first encountered at 4 feet and measured at 3/4 foot after augers were pulled								
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-6
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE **8**

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **4 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Bulk**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN SANDY CLAY WITH GRAVEL (CH), medium stiff to stiff, moist								
				Boring terminated at 4 feet No groundwater encountered								
5												
10												
15												

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-7
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
9

Date(s) Drilled **1/13/2020**	Logged By **KU**	Checked By **EGC**
Drilling Method **Solid-Stem Auger**	Drill Bit Size/Type **4"**	Total Depth of Borehole **3 feet**
Drill Rig Type **Portable**	Drilling Contractor **Benevent**	Approximate Surface Elevation **Existing Ground Surface**
Groundwater Level and Date Measured **No Groundwater Encountered**	Sampling Method(s) **Bulk**	Hammer Data **140lb, 30" drop**

Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
0				DARK BROWN CLAYEY SAND WITH GRAVEL (SC), medium dense to dense, moist								
				Boring terminated at 3 feet No groundwater encountered								
5												
10												
15												

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Job No: 1323.08.PW.1 | Date: FEB 2020

LOG OF BORING B-8
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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Elevation (feet)	Depth (feet)	Sample Type	Sampling Resistance, blows/ft	Graphic Log	MATERIAL DESCRIPTION	Dry Density (pcf)	Water Content (%)	% <#200 Sieve	PI, %	LL, %	Expansion Index (EI)	UC, ksf	REMARKS AND OTHER TESTS
1	2	3	4	5	6	7	8	9	10	11	12	13	14

COLUMN DESCRIPTIONS

1 Elevation (feet): Elevation (MSL, feet).
2 Depth (feet): Depth in feet below the ground surface.
3 Sample Type: Type of soil sample collected at the depth interval shown.
4 Sampling Resistance, blows/ft: Number of blows to advance driven sampler one foot (or distance shown) beyond seating interval using the hammer identified on the boring log.
5 Graphic Log: Graphic depiction of the subsurface material encountered.
6 MATERIAL DESCRIPTION: Description of material encountered. May include consistency, moisture, color, and other descriptive text.
7 Dry Density (pcf): Dry density, in pcf.
8 Water Content (%): Water content, percent.
9 % <#200 Sieve: % <#200 Sieve
10 PI, %: Plasticity Index, expressed as a water content.
11 LL, %: Liquid Limit, expressed as a water content.
12 Expansion Index (EI): Expansion Index (EI)
13 UC, ksf: Unconfined compressive strength, in kips per square foot.
14 REMARKS AND OTHER TESTS: Comments and observations regarding drilling or sampling made by driller or field personnel.

FIELD AND LABORATORY TEST ABBREVIATIONS

CHEM: Chemical tests to assess corrosivity
COMP: Compaction test
CONS: One-dimensional consolidation test
LL: Liquid Limit, percent
PI: Plasticity Index, percent
SA: Sieve analysis (percent passing No. 200 Sieve)
UC: Unconfined compressive strength test, Qu, in ksf
WA: Wash sieve (percent passing No. 200 Sieve)
Su: Shear Strength

MATERIAL GRAPHIC SYMBOLS

Andesite
Fat CLAY, CLAY w/SAND, SANDY CLAY (CH)
Lean CLAY, CLAY w/SAND, SANDY CLAY (CL)
SILT, SILT w/SAND, SANDY SILT (ML)
Clayey SAND (SC)

TYPICAL SAMPLER GRAPHIC SYMBOLS

2.5-inch-ID Modified California w/ brass liners
2-inch-OD unlined split spoon (SPT)
Bulk Sample

OTHER GRAPHIC SYMBOLS

Water level (at time of drilling, ATD)
Water level (after waiting)
Minor change in material properties within a stratum
Inferred/gradational contact between strata
Queried contact between strata

GENERAL NOTES

1: Soil classifications are based on the Unified Soil Classification System. Descriptions and stratum lines are interpretive, and actual lithologic changes may be gradual. Field descriptions may have been modified to reflect results of lab tests.
2: Descriptions on these logs apply only at the specific boring locations and at the time the borings were advanced. They are not warranted to be representative of subsurface conditions at other locations or times.

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Job No: 1323.08.PW.1 | Date: FEB 2020

SOIL CLASSIFICATION AND KEY TO TEST DATA

Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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LAYERING

MASSIVE	Greater than 6 feet
THICKLY BEDDED	2 to 6 feet
MEDIUM BEDDED	8 to 24 inches
THINLY BEDDED	2½ to 8 inches
VERY THINLY BEDDED	¾ to 2½ inches
CLOSELY LAMINATED	¼ to ¾ inches
VERY CLOSELY LAMINATED	Less than ¼ inch

JOINT, FRACTURE, OR SHEAR SPACING

VERY WIDELY SPACED	Greater than 6 feet
WIDELY SPACED	2 to 6 feet
MODERATELY SPACED	8 to 24 inches
CLOSELY SPACED	2½ to 8 inches
VERY CLOSELY SPACED	¾ to 2½ inches
EXTREMELY CLOSELY SPACED	Less than ¼ inch

HARDNESS

Soft - pliable; can be dug by hand

Firm - can be gouged deeply or carved with a pocket knife

Moderately Hard - can be readily scratched by a knife blade; scratch leaves heavy trace of dust and is readily visible after the powder has been blown away

Hard - can be scratched with difficulty; scratch produces little powder and is often faintly visible

Very Hard - cannot be scratched with pocket knife, leaves a metallic streak

STRENGTH

Plastic - capable of being molded by hand

Friable - crumbles by rubbing with fingers

Weak - an unfractured specimen of such material will crumble under light hammer blows

Moderately Strong - specimen will withstand a few heavy hammer blows before breaking

Strong - specimen will withstand a few heavy ringing hammer blows and usually yields large fragments

Very Strong - rock will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments

DEGREE OF WEATHERING

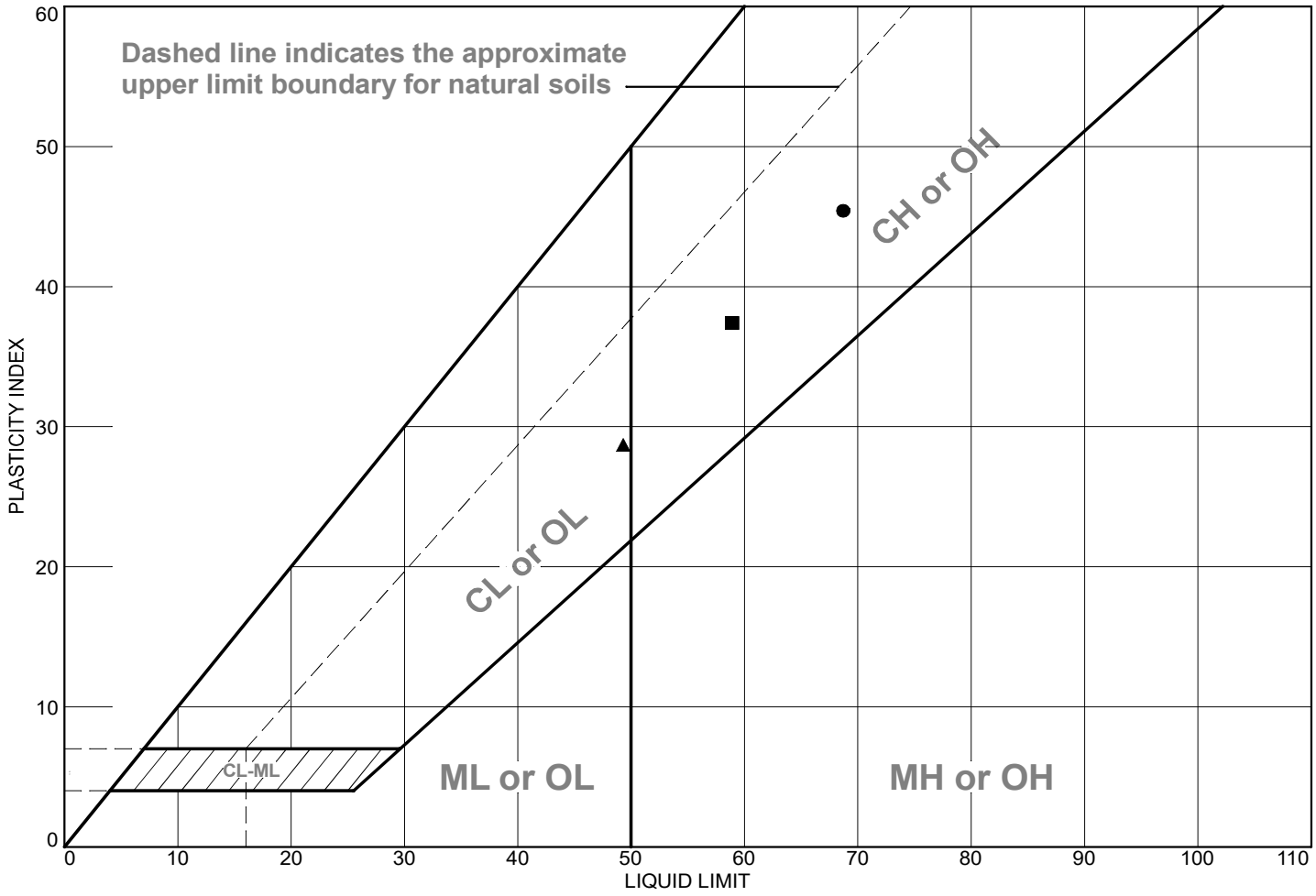
Highly Weathered - abundant fractures coated with oxides, carbonates, sulphates, mud, etc., thorough discoloration, rock disintegration, mineral decomposition

Moderately Weathered - some fracture coating, moderate or localized discoloration, little to no effect on cementation, slight mineral decomposition

Slightly Weathered - a few stained fractures, slight discoloration, little or no effect on cementation, no mineral composition

Fresh - unaffected by weathering agents; no appreciable change with depth

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown Clay (CH)	68.7	23.3	45.4			CH
■	Brown Clay W/ Sand (CH)	58.9	21.5	37.4			CH
▲	Dark Brown Clay (CL)	49.3	20.6	28.7			CL

Project No. 1323.08.PW.1 **Client:** RGH Consultants

Project: Fairfield Osborn Preserve Improvements

● **Source of Sample:** B-1 **Depth:** 1.0'-2.0'
■ **Source of Sample:** B-2 **Depth:** 2.5' & 3.0'
▲ **Source of Sample:** B-5 **Depth:** 1.5'-2.0'

Tested By: ○ SCW □ SCW △ SEF **Checked By:** SEF

Remarks:
● Expansion Index= 162 (Very High)
■ Expansion Index= 121 (High)
▲ Expansion Index= 75 (Medium)

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: FEB 2020

CLASSIFICATION TEST DATA
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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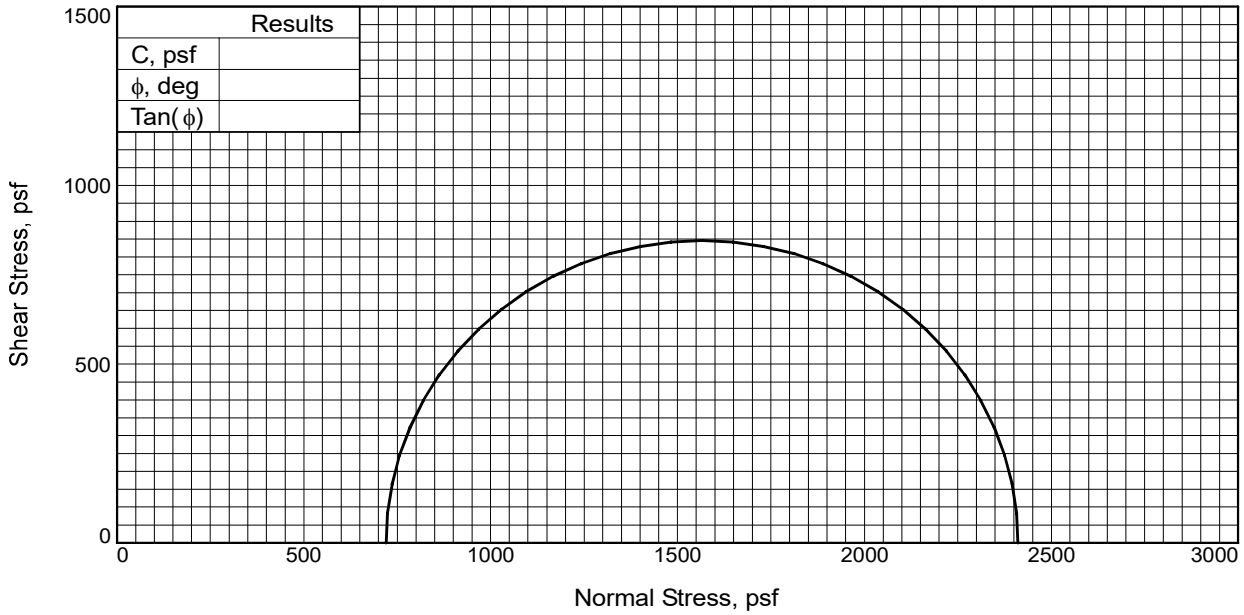

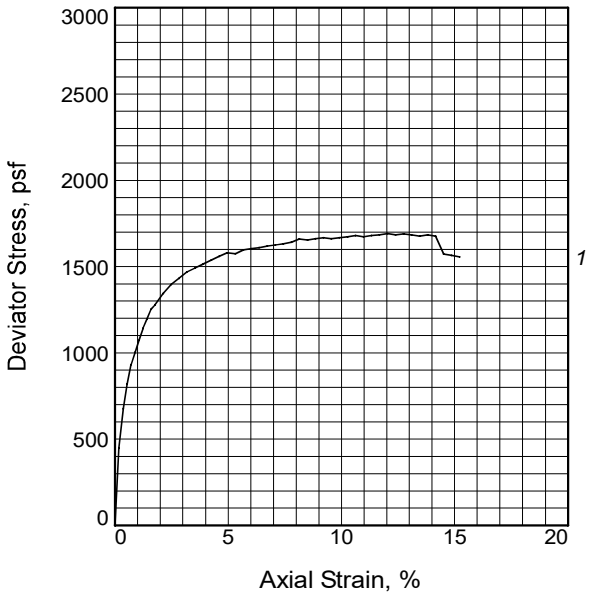

Sample No.		1
Initial	Water Content, %	30.4
	Dry Density, pcf	88.1
	Saturation, %	89.8
	Void Ratio	0.9141
	Diameter, in.	2.41
	Height, in.	5.65
At Test	Water Content, %	33.9
	Dry Density, pcf	88.1
	Saturation, %	100.0
	Void Ratio	0.9141
	Diameter, in.	2.41
	Height, in.	5.65
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		1691
Strain, %		12.0
Ult. Stress, psf		1691
Strain, %		12.0
σ_1 Failure, psf		2411
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained

Sample Type: Tube

Description: Brown Clay (CH)

Assumed Specific Gravity= 2.70

Remarks: Reported 1/22/20

Tested By: SAM

Client: RGH Consultants

Project: Fairfield Osborn Preserve Improvements

Source of Sample: B-1 **Depth:** 2.0'

Proj. No.: 1323.08.PW.1 **Date Sampled:** 1/13/20

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: FEB 2020

TRIAXIAL TEST DATA

Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE

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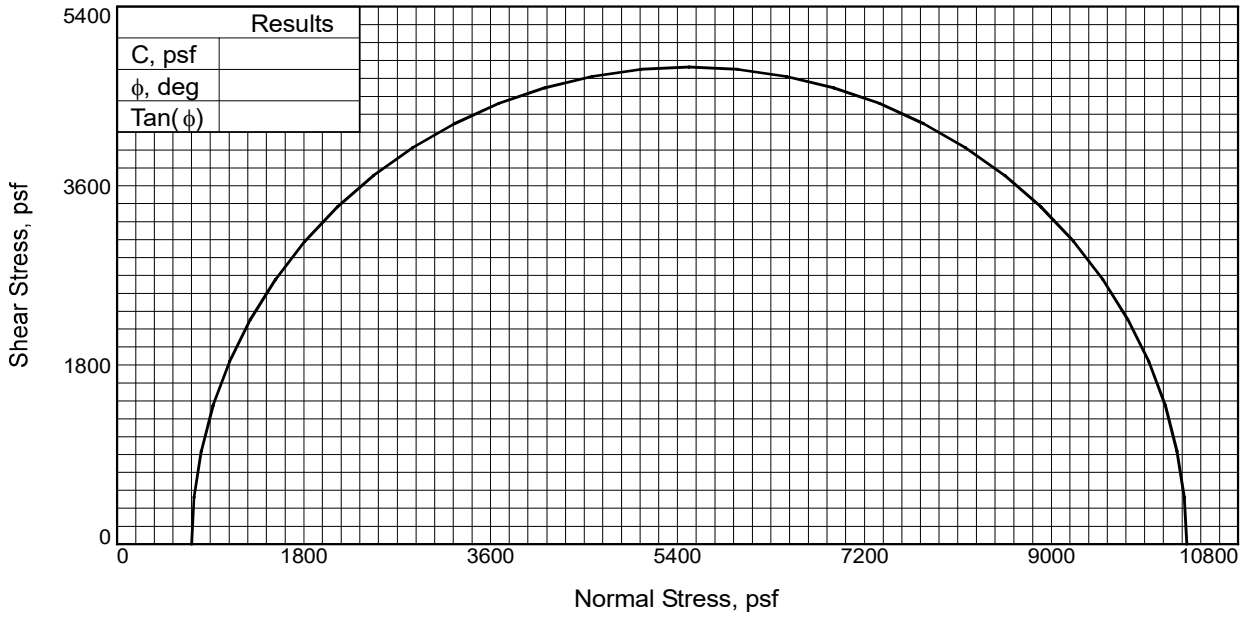

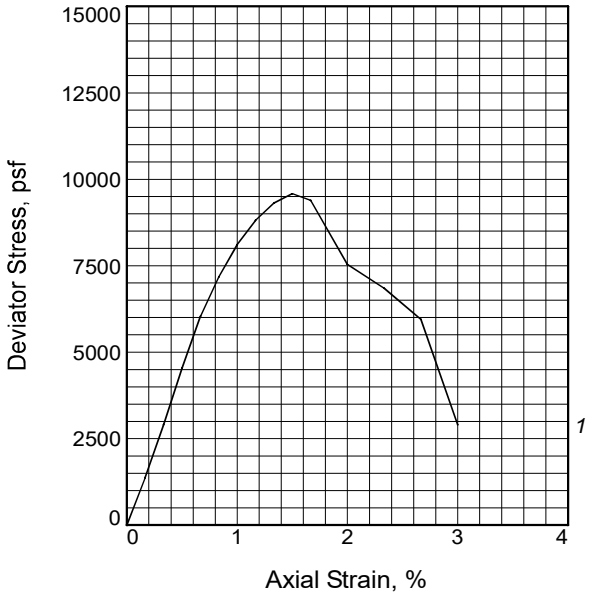

Sample No.		1
Initial	Water Content, %	19.8
	Dry Density, pcf	100.7
	Saturation, %	79.2
	Void Ratio	0.6745
	Diameter, in.	2.39
	Height, in.	6.00
At Test	Water Content, %	25.0
	Dry Density, pcf	100.7
	Saturation, %	100.0
	Void Ratio	0.6745
	Diameter, in.	2.39
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		9585
Strain, %		1.5
Ult. Stress, psf		9585
Strain, %		1.5
σ_1 Failure, psf		10305
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained

Sample Type: Tube

Description: Brown Sandy Clay (CL)

Assumed Specific Gravity= 2.70

Remarks: Reported 1/22/20

Tested By: SAM
Checked By: SEF

Client: RGH Consultants

Project: Fairfield Osborn Preserve Improvements

Source of Sample: B-1 **Depth:** 6.0'

Proj. No.: 1323.08.PW.1 **Date Sampled:** 1/13/20

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: FEB 2020

TRIAXIAL TEST DATA

Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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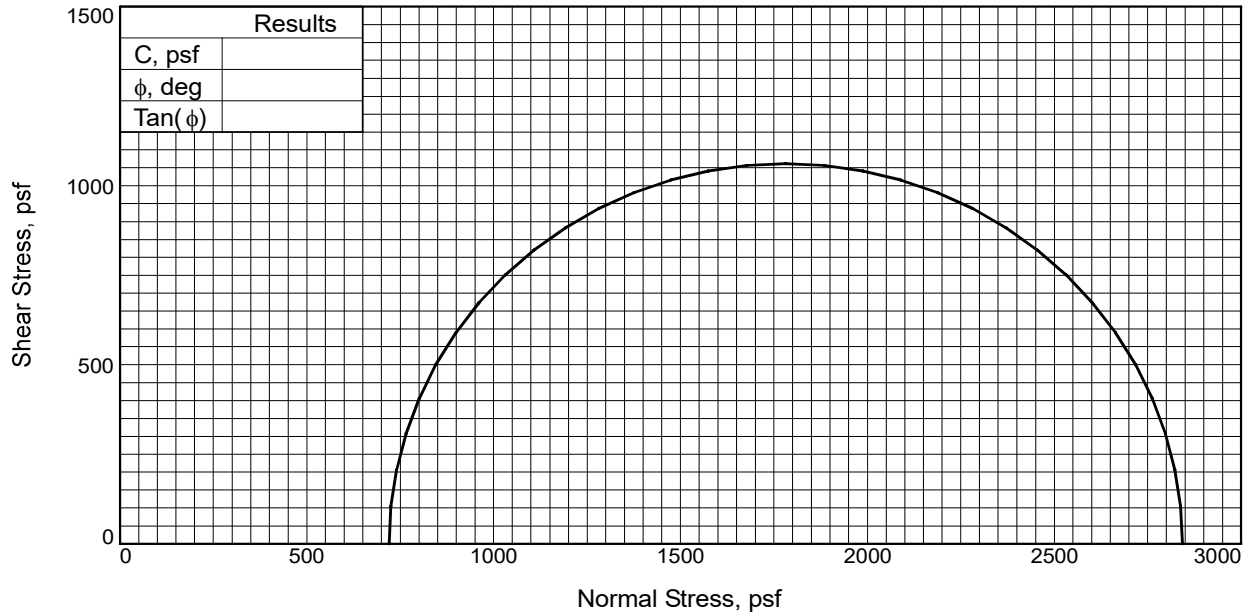

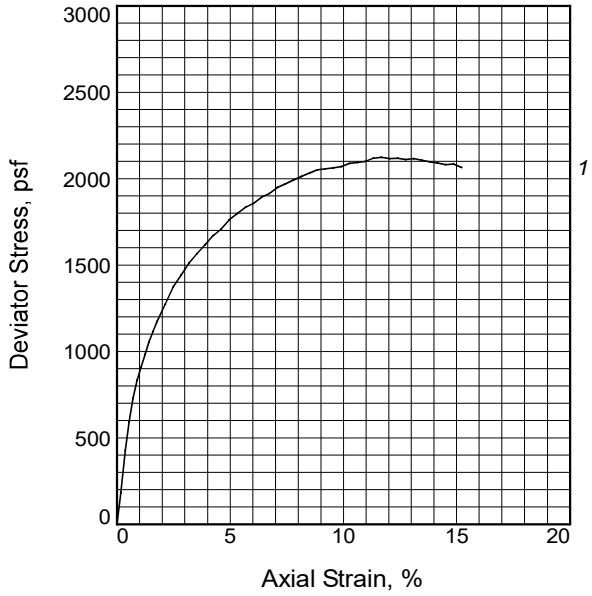

Sample No.		1
Initial	Water Content, %	24.8
	Dry Density, pcf	96.9
	Saturation, %	90.6
	Void Ratio	0.7392
	Diameter, in.	2.41
	Height, in.	5.65
At Test	Water Content, %	27.4
	Dry Density, pcf	96.9
	Saturation, %	100.0
	Void Ratio	0.7392
	Diameter, in.	2.41
	Height, in.	5.65
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		2123
Strain, %		11.7
Ult. Stress, psf		2123
Strain, %		11.7
σ_1 Failure, psf		2843
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Dark Brown Clay (CL)

Assumed Specific Gravity= 2.70
Remarks: Reported 1/22/20

Tested By: SAM
Checked By: SEF

Client: RGH Consultants

Project: Fairfield Osborn Preserve Improvements

Source of Sample: B-5 **Depth:** 2.0'

Proj. No.: 1323.08.PW.1 **Date Sampled:** 1/13/20

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: FEB 2020

TRIAXIAL TEST DATA

Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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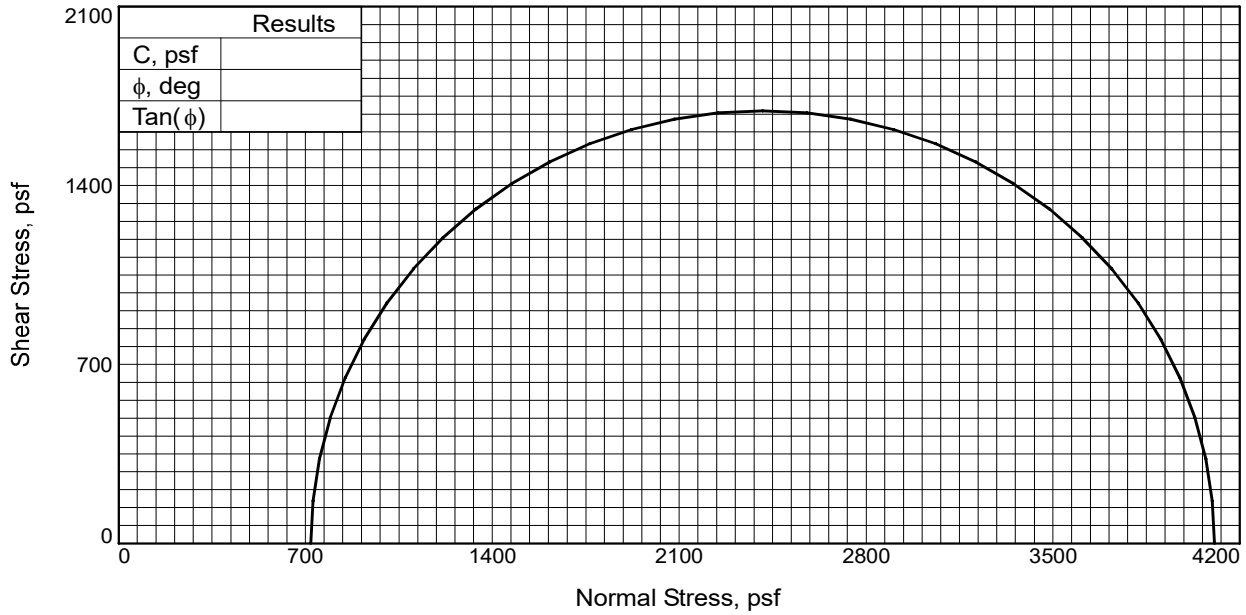

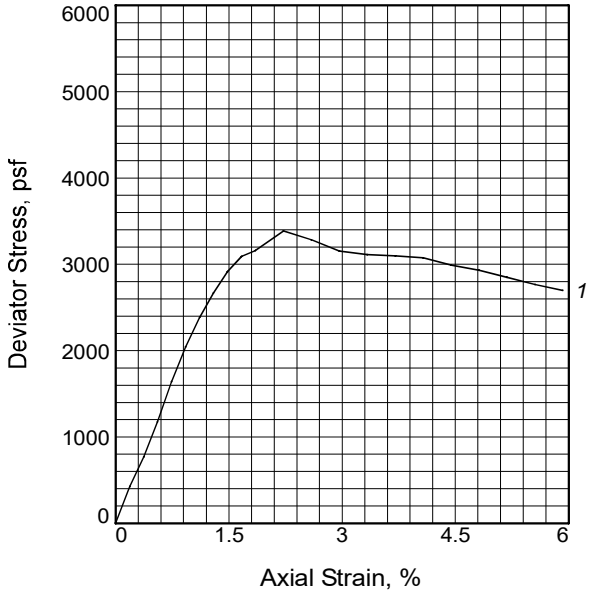

Sample No.		1
Initial	Water Content, %	24.0
	Dry Density, pcf	101.5
	Saturation, %	98.1
	Void Ratio	0.6604
	Diameter, in.	2.42
	Height, in.	5.40
At Test	Water Content, %	24.5
	Dry Density, pcf	101.5
	Saturation, %	100.0
	Void Ratio	0.6604
	Diameter, in.	2.42
	Height, in.	5.40
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		3385
Strain, %		2.2
Ult. Stress, psf		3385
Strain, %		2.2
σ_1 Failure, psf		4105
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained

Sample Type: Tube

Description: Brown Sandy Clay W/ Gravel (CL)

Assumed Specific Gravity= 2.70

Remarks: Reported 1/22/20

Tested By: SAM
Checked By: SEF

Client: RGH Consultants

Project: Fairfield Osborn Preserve Improvements

Source of Sample: B-5 **Depth:** 6.0'

Proj. No.: 1323.08.PW.1 **Date Sampled:** 1/13/20

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Job No: 1323.08.PW.1 | Date: FEB 2020

TRIAXIAL TEST DATA

Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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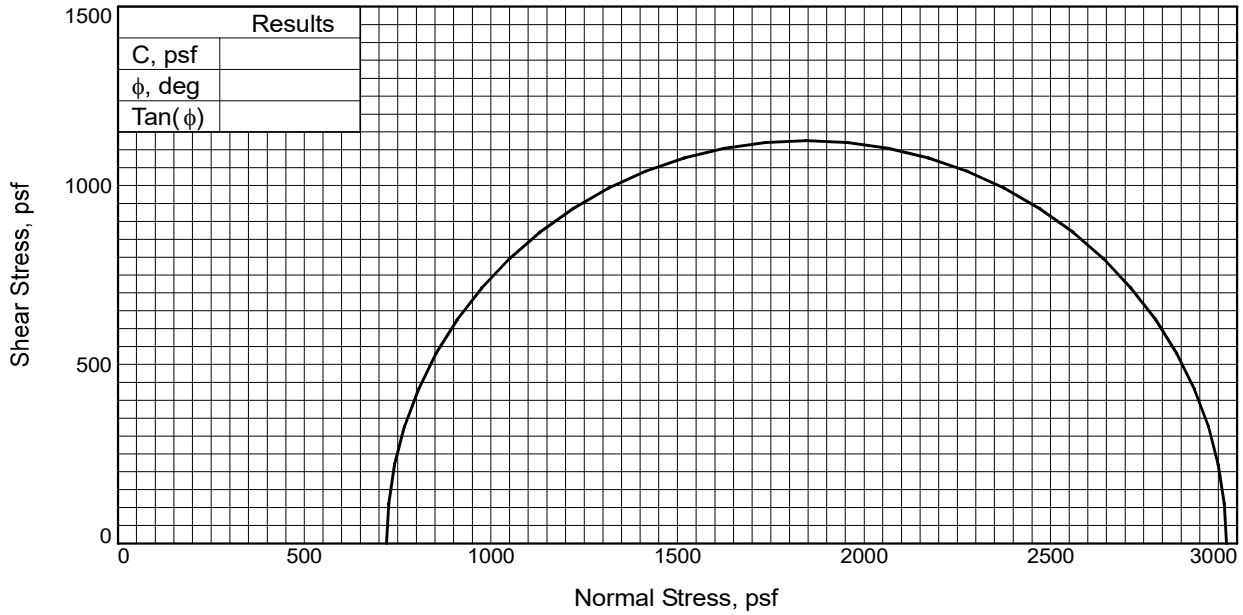

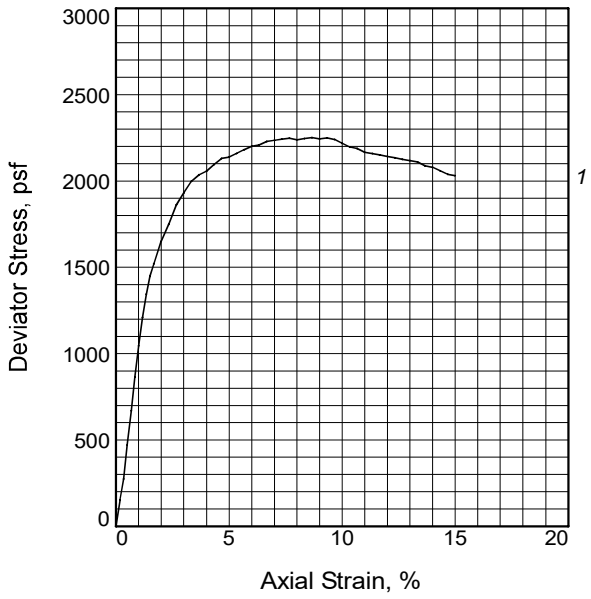

Sample No.		1
Initial	Water Content, %	33.8
	Dry Density, pcf	85.6
	Saturation, %	94.2
	Void Ratio	0.9689
	Diameter, in.	2.41
	Height, in.	6.00
At Test	Water Content, %	35.9
	Dry Density, pcf	85.6
	Saturation, %	100.0
	Void Ratio	0.9689
	Diameter, in.	2.41
	Height, in.	6.00
Strain rate, in./min.		0.060
Back Pressure, psf		0
Cell Pressure, psf		720
Fail. Stress, psf		2251
Strain, %		8.7
Ult. Stress, psf		2251
Strain, %		8.7
σ_1 Failure, psf		2971
σ_3 Failure, psf		720

Type of Test:
Unconsolidated Undrained
Sample Type: Tube
Description: Dark Brown Clay W/ Sand (CH)

Assumed Specific Gravity= 2.70
Remarks: Reported 1/22/20

Tested By: SAM
Checked By: SEF

Client: RGH Consultants

Project: Fairfield Osborn Preserve Improvements

Source of Sample: B-6 **Depth:** 3.0'

Proj. No.: 1323.08.PW.1 **Date Sampled:** 1/13/20

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: JAN 2020

TRIAXIAL TEST DATA

Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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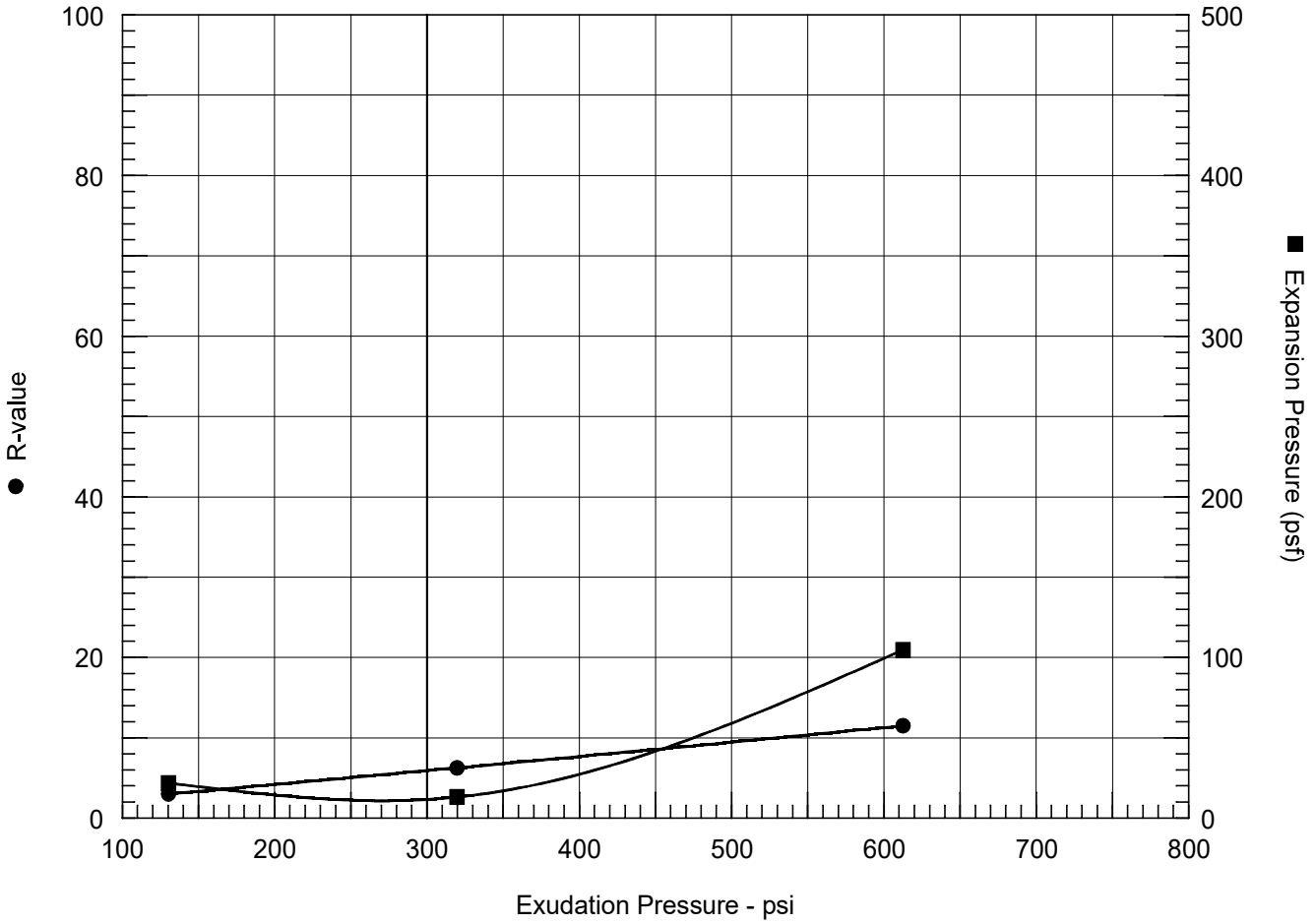
R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - ASTM D2844

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psf	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	25	99.3	25.1	22	150	2.43	130	3	3
2	30	102.5	23.7	13	142	2.49	320	6	6
3	75	109.5	20.2	105	130	2.52	613	11	11

Test Results	Material Description
R-value at 300 psi exudation pressure = 6 **Exp. pressure at 300 psi exudation pressure =** 12 psf	Brown Sandy Clay (CH)
Project No.: 1323.08.PW.1 **Project:** Fairfield Osborn Preserve Improvements **Source of Sample:** B-7 & 8 **Depth:** 0.0'-4.0',0.0'-3.0'	**Tested by:** SAM **Checked by:** SEF

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Job No: 1323.08.PW.1 | Date: JAN 2020

RESISTANCE (R) VALUE DATA
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
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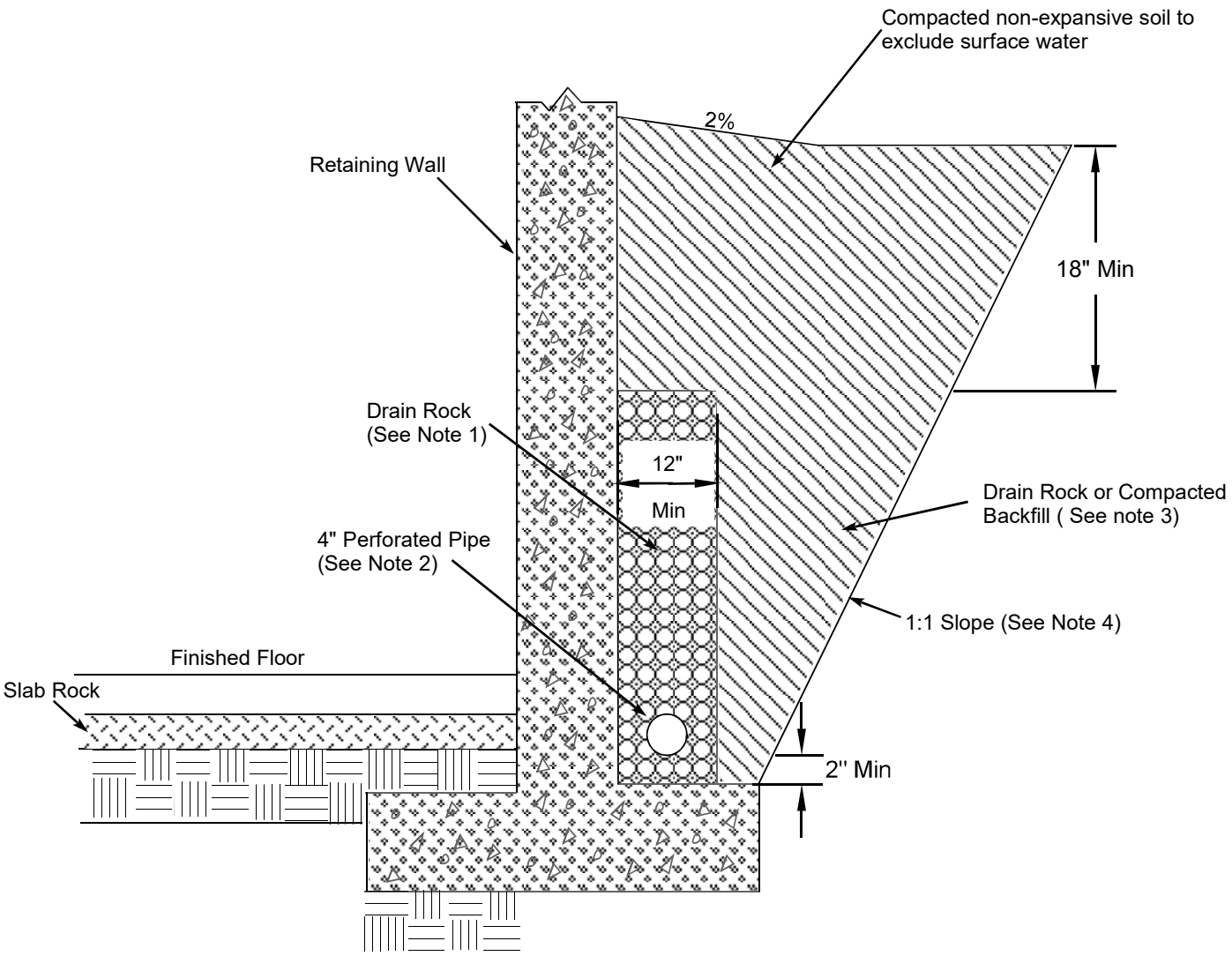

Notes:

1. Drain rock should meet the requirements for Class 2 Permeable Material, Section 68, State of California "Caltrans" Standard Specification, latest edition. Drain rock should be placed to approximately three-quarters the height of the retaining wall.

2. Pipe should conform to the requirements of Section 68 of State of California "Caltrans" Standards, perforations placed down, sloped at 1% for gravity flow to outlet or sump with automatic pump. The pipe invert should be located at least 8 inches below the lowest adjacent finished surface.

3. During construction the contractor should use appropriate methods such as temporary bracing and/or light compaction equipment to avoid overstressing the walls. Non-expansive soils to be used as backfill.

4. Slope excavation back at a 1:1 gradient from the back of footing where expansive materials are exposed.

Not to Scale

RGH CONSULTANTS

Job No: 1323.08.PW.1 | Date: FEB 2020

RETAINING WALL BACKDRAIN ILLUSTRATION
Fairfield Osborn Preserve Improvements
Lichau Road
Penngrove, California

PLATE
20

APPENDIX B - REFERENCES

American Society of Civil Engineers, 2017, Minimum Design Loads and Associated Criteria for Buildings and Other Structures, ASCE Standard ASCE/SEI 7-16.

Bryant, W.A., and Hart, E.W., Interim Revision 2007, Fault-Rupture Zones in California; California Geological Survey, Special Publication 42, p. 21 with Appendices A through F.

California Building Code, 2019, California Building Standard Commission.

Dwyer, M.J., Noguchi, N., and O'Rourke, J., 1976, Reconnaissance Photo-Interpretation Map of Landslides in 24 Selected 7.5-Minute Quadrangles in Lake, Napa, Solano, and Sonoma Counties, California: U.S. Geological Survey OFR 76-74, 25 Plates, Scale 1:24,000.

Natural Resources Conservation Service, United States Department of Agriculture, accessed January 28, 2020. Web Soil Survey, available online at http://websoilsurvey.nrcs.usda.gov/.

Wagner, D.L., Randolph-Loar, C.E., Witter, R.C., and Huffman, M.E., 2003, Geologic Map of the Glen Ellen 7.5' Quadrangle, Sonoma County, California: A Digital Database, Version 1.0, California Geological Survey, Scale 1:24,000.

APPENDIX C - DISTRIBUTION

Sonoma State University (e)
Attention: Kristi Marian
1801 East Cotati Avenue
Rohnert Park, CA 94928
marian@sonoma.edu

EGC:JJP:ku:bw

s:\project files\1251-1500\1323\1323.08.pw.1 fairfield osborn preserve improvements\gs report.doc

Important Information About Your

Geotechnical Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes

The following information is provided to help you manage your risks.

Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared *solely* for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. *And no one - not even you* - should apply the report for any purpose or project except the one originally contemplated.

Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

A Geotechnical Engineering Report Is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from alight industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes - even minor ones - and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. *Do not rely on a geotechnical engineering report* whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. *Always* contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ-sometimes significantly from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

A Report's Recommendations Are *Not* Final

Do not overrely on the construction recommendations included in your report. *Those recommendations are not final*, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual

subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

A Geotechnical Engineering Report Is Subject to Misinterpretation

Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

Give Contractors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure contractors have sufficient time* to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

Read Responsibility Provisions Closely

Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform a *geoenvironmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. *Do not rely on an environmental report prepared for someone else.*

Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the express purpose of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, a number of mold prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical engineering study whose findings are conveyed in-this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; ***none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.***

Rely on Your ASFE-Member Geotechnical Engineer For Additional Assistance

Membership in ASFE/The Best People on Earth exposes geotechnical engineers to a wide array of risk management techniques that can be of genuine benefit for everyone involved with a construction project. Confer with your ASFE-member geotechnical engineer for more information.

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